

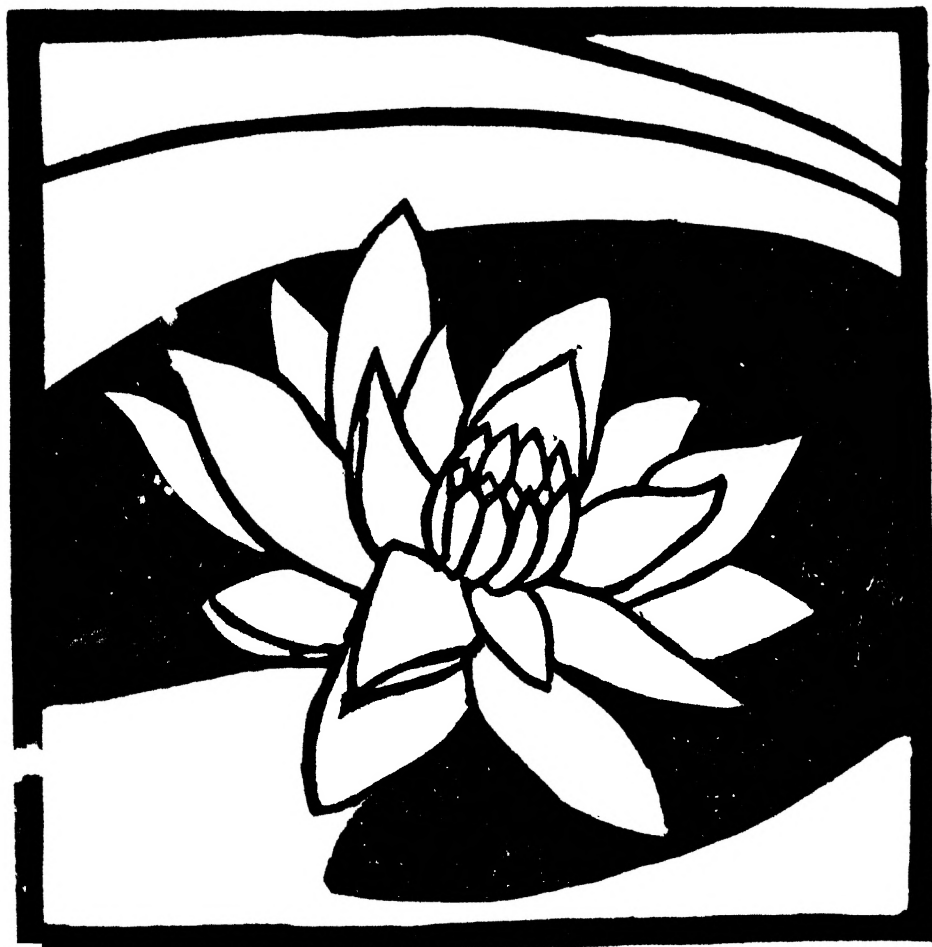


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The NATIONAL HORTICULTURAL MAGAZINE



JOURNAL OF THE AMERICAN HORTICULTURAL SOCIETY

APRIL, 1941 — 1942

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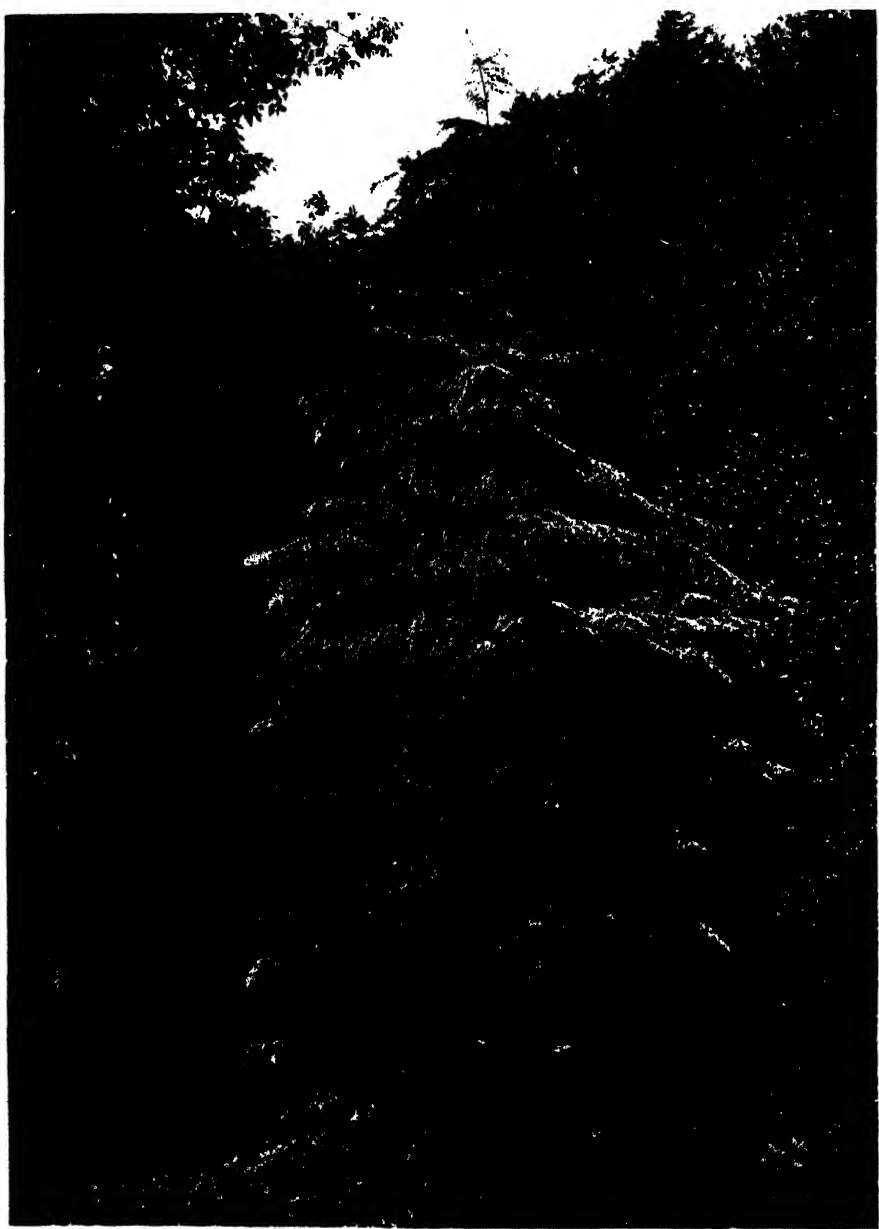
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Peter Bisset

*Tsuga Mertensiana, Holden Hall Park, San Francisco, California,
April 13, 1934*

Hemlocks

CHARLES F. JENKINS

IT is appropriate that a citizen of the Keystone State should be asked to prepare an article on the Tsugas, as the Hemlock is the official State Tree of Pennsylvania. As the Act of Assembly passed in 1931 states, it is still today, as of old, the tree most typical of the forests of Pennsylvania. From the first settlement of the Colonies it has been an invaluable source of lumber supply and later its bark was sought for tanning purposes. In 1887 one million two hundred thousand tons of hemlock bark were cut and used for tanning and in many cases the logs were allowed to rot. But in modern times here in the East, at least, other woods have largely taken its place and other chemicals have supplanted it for tanning. So it is as a nursery-grown, horticultural specimen and ornament for the garden, lawn and country estate that it has taken its place as one of the most important and valued features in landscape work.

The first of our great American landscape architects and writers was A. J. Downing, who in 1854, in his book "Rural Essays," recognized the value of the hemlock from the horticultural viewpoint. He then wrote: "We place the hemlock first, as we consider it beyond all question the most graceful tree grown in this Country. There are few who have the least idea of its striking beauty when grown alone in a smooth lawn; its branches extending freely on all sides and sweeping the ground, its loose spray and full feathery foliage floating freely in the air, and its proportions full of the first symmetry and beauty." It was not until after the Hemlock Arboretum was established at "Far Country" on the banks of the Wissahickon Valley near Philadelphia,

Pennsylvania, that I found this and many other quotations from poets and horticultural writers extolling the beauty of the hemlock.

An old Pennsylvania lumberman, who ran rafts down the Susquehanna River, once said the early Scotch-Irish settlers of Pennsylvania regarded the white pines as "noble" trees and spoke of a forest of them as a "House of Lords," whereas the hemlocks lacked "quality" and he likened them to a "House of Commons." I hold no brief for the hemlock against the white pine, except for gracefulness, but it might be pointed out that in the English form of government the House of Commons is the more important—

The pine is called the "kingly" tree,
It well deserves full royalty.
The hemlock's called the "princely" tree,
This lower rank is not for me.
Right here and now, Oh hemlock tree,
A royal crown is given thee;
Not prince, but equal, "Queenly" tree
In beauty, grace and symmetry.
Full honor his, great honor hers,
The king and queen of conifers.

The botanical name of the genus hemlock, *Tsuga*, comes from Japan, meaning "the mother tree." When our Eastern hemlock, *Tsuga canadensis*, was introduced to Europe it was included with the pines in the genus *Pinus*. Later, the French botanist Michaux grouped it with the firs; just later it was placed with the spruces, until an Austrian used the name *Tsuga* as a section of his genus *Pinus*. Finally the celebrated French botanist, Carriere, classified all hemlocks in a separate group under the generic name *Tsuga*. Thus this important section of our North American conifers bears a

Japanese name given it by an Austrian, confirmed by a Frenchman, and now accepted by botanists generally. When introduced to English people, our native eastern hemlock was considered and called a spruce. Because its leaves and branches resembled the European poison-hemlock, *Conium maculatum*, a weed of the carrot family well known in Europe, it was called hemlock-spruce—that is, the spruce with hemlock-like leaves. When years later the botanists determined it was not a spruce, the name hemlock continued as the common, everyday, name although in many sections it is still called “hemlock-spruce.”

Visitors to the Hemlock Arboretum often ask which part of the hemlock is poisonous, the roots or the leaves, having confused it with the concoction of the poisonous weed that the Athenians used to put criminals to death, some of which they gave Socrates, the Greek philosopher. Plato's description of the symptoms caused by hemlock poisoning is one of the masterpieces of the literature of the world, as he tells of the last hours of his beloved friend. No part of our *Tsuga* is poisonous.

Hemlocks are indigenous to North America and eastern Asia. They are not found native in Europe, Western Asia, Africa or in the Southern Hemisphere. Our botanists and horticulturists describe two recognized species in the eastern United States, two on our Pacific coast, two in Japan, two in China and one each in the Himalayas and the Island of Formosa.

Of the foreign species, *Tsuga dumosa*, coming from the Himalaya Mountains in Sikkim and Nepal, a most distinctive hemlock, is not hardy in the neighborhood of Philadelphia. It comes from high in the mountains where the rainfall averages 120 inches or more in a year. Likewise *Tsuga Yunnanensis*,

from the Chinese province of that name, “the land below the clouds,” will not stand our climate and more severe winters at the Hemlock Arboretum. The little plants of *Tsuga formosana*, grown from seed kindly obtained for me by the editor of *The National Horticulturist* will not survive the winter. All of these we grow in pots and take them to the friendly shelter of the greenhouses of the Morris Arboretum for their winter sojourn. But during the growing season they are here available for study and comparison with other sister species. The remaining foreigners are perfectly hardy. *Tsuga chinensis* from the province of Szechuan in western China, is growing successfully as far north as Boston, in the Arnold Arboretum and last season the plants at “Far Country” made a growth of twenty inches. We have two specimens growing side by side. A seedling which W. H. Judd of the Arnold Arboretum grew from seed obtained from the Sun Yet Sen Park, in Nanking, China, and a plant grafted on *Tsuga canadensis* stock. They are of identically the same age but the seedling is outstripping the grafted plant in growth and symmetry.

The two species from Japan are also hardy. *Tsuga diversifolia* is one of the best of the hemlocks for ornamental purposes. It is dwarf and slow growing, of unusual beauty and distinction. The under side of its leaves, when a branch is turned up, are greyish white and on this account the Japanese call it the “rice tree.” It was introduced in the United States in 1861.

Tsuga Sieboldi, the larger Japanese species, is a more rapidly growing tree. It was introduced in the United States in 1850 and both species are grown and sold by nurserymen specializing in the rare plants. No variations of these foreign species have so far been obtainable.



Tsuga Sieboldii, Arboretum Filmorin, Verrier le Buisson, France,
August, 1935

The two hemlocks from the Pacific Coast, *Tsuga heterophylla* and *Tsuga Mertensiana*, are important trees in their locality. The former is one of the valued timber trees in the Northwest. The forestry authorities of British Columbia told me, on a recent visit, they were growing it "by the millions" for reforestation purposes. But on the western coast its use as an ornamental is very restricted. A visit to one of the larger nurseries near Seattle disclosed but a bare dozen specimens awaiting purchasers. Josiah Hoopes, who wrote the first book in America on Conifers, while extolling the beauty of our eastern hemlock said the only tree which could compare with it for beauty was the Deodar—*Cedrus deodara*. In lower California we found the latter used for ornamental purposes exclusively, as against the western hemlock, which compares most favorably in beauty and symmetry with our eastern hemlock. A native of the Pacific Northwest, it gets plenty of moisture; for this reason it does not do well in the Hemlock Arboretum. It grows, but it looks unhappy and the fateful day in February of 1934, with the temperature fourteen degrees below zero, killed the leader back and damaged the tree considerably. On the other hand the Mountain Hemlock, *Tsuga Mertensiana*, coming from the high Sierras, is a contented, although slow growing inhabitant of the Arboretum. Our stock came from the mountains back of Juneau, Alaska, and numerous specimens now ten years old are beginning to make a good showing. It is this tree in its natural habitat which has aroused the enthusiasm of western poets and naturalists. Readers who are familiar with the writings of John Muir will come across many allusions to its grace and beauty. Of this species we have but one variation, a glaucous plant as yet too small to determine what it will do.

It was back in 1856 that Dr. Lewis R. Gibbes of South Carolina had an epistolary controversy with Dr. Asa Gray over what the former thought was a new species of hemlock. It was a small tree, "twenty to twenty-five feet high, branches thickly set on the trunk and the foliage is a very deep green, blackish looking at a distance. The tree is rare and but few in a group." In 1881 it was officially named *Tsuga carolinia*. Its native habitat is the mountains of southwestern Virginia to northern Georgia. It is hardy as far north as New England and in every way a desirable ornamental. There are two variations in the Hemlock Arboretum, a denser round-top form, *Tsuga carolinia compacta*, and an immature fastigiata. A dwarf form is growing in a well known New England Nursery and it is said there is a weeping variety in existence. Visitors to the group of this species in the Arnold Arboretum come away filled with enthusiasm for its distinction.

It is to our Eastern Hemlock, *Tsuga canadensis*, which is native to the Atlantic Seaboard from Canada to northern Georgia, that we turn for the many variations which have added interest and zest to the collectors' task. John C. Swartley, a young man who had graduated from the University of Pennsylvania and went from there to do practical work at the nearby Morris Arboretum, took the Hemlock Arboretum as a laboratory for advanced study. Starting in the spring of 1938 he has devoted a large part of his time to studying the mutations of *Tsuga canadensis*. The result of his labors appeared in a Thesis presented to Cornell University, where he had been taking an advanced course in Ornamental Horticulture. In the preparation of this work Mr. Swartley visited many of the nurseries, arboreta and private estates



Dr. A. B. Stout

*Group of Sargent's Weeping Hemlock in Fairmount Park, Philadelphia,
which were shown at the Centennial Exposition in 1876*



Dr. A. B. Stout

Sargent's Weeping Hemlocks at Inver House, near Philadelphia

in New England and the Middle States. He found sixty-one variants of *Tsuga canadensis*, all of which had been named, many of which, however, were similar to plants bearing other names. There was confusion and duplication. A nurseryman or botanist or plant lover would find an unusual hemlock growing in his nursery rows or in the wild, proceed to propagate it, give it or have it given a name, without knowing that an identical plant bore some other name.

Using the Hemlock Arboretum as a laboratory Mr. Swartley proceeded to try to bring order out of chaos. Co-operating with the Committee which is now at work on the new edition of "Standardized Plant Names" the natural seed variations were reduced to twenty classes as follows:

Broadleaf	Pygmy
Bushy Globe	Prostrate
Cinnamon	Pyramidal
Dense	Dwarf Pyramidal
Denseleaf	Sparselaf
Fastigiata	Spreading
Globe	Twiggy
Golden	Weeping
Largeleaf	Whitetip
Littleleaf	Yewlike

Specimens of all of these are growing in the Hemlock Arboretum.

In the above classification it will be noted that some are differentiated by their form or manner of growth, as bushy, fastigiata, pyramidal, weeping, spreading, prostrate, etc. Others are specialized by their color, golden, white tip and cinnamon, while the third class are those whose description depends on their leaves as to size, color, manner of growth and shape. It will not be possible in the limited space of a magazine article to describe all these mutations of *Tsuga caroliniana*. Perhaps the best known and most popular are the weeping, pendulous trees and head

ing this list is Sargent's Weeping Hemlock. This variety is important in the distinguished discoverer and the manner of its original propagation and dissemination, aside from its natural beauty. General Joseph Howland sometime before 1870 found four seedlings in the mountains back of Beacon, N. Y. He gave one to his good neighbor Henry W. Sargent, another to the famous Hunnewell Arboretum at Wellesley, Mass., another to Dr. Charles S. Sargent of the Arnold Arboretum, retaining one for himself. Of these, the latter two are still growing and flourishing. From some of these original plants grafts were taken and plants were shown in the horticultural display at the Centennial Exposition in Philadelphia in 1876. They created a great sensation among horticulturists and nature lovers and as a result there are growing today around Philadelphia in the older gardens many of these early specimens. They were all grafted on *Tsuga canadensis* stock and in most cases this has influenced the plant so that the clones are never quite as low growing as their ancestor.

If you have room for only one hemlock plant a Sargent, picking one from the nursery row that is most pendulous. The plant at the Hemlock Arboretum is now thirty years old and we call it "A vernal fountain of perpetual joy."

Of twelve specimens of Sargent's Weeping Hemlock planted in the Centennial gardens, four still survive and form a most striking and beautiful group on the lawn near Horticultural Hall. At Inver House, a country estate some twelve miles from Philadelphia, are a dozen of these graceful and unusual trees which must be at least sixty years old. Just before the crash in 1929, ten of them had been sold to a gentleman on Long Island for \$1,600 apiece, delivered and planted. It took



*A dwarf, globose form of Tsuga canadensis, 30 years old,
at Hemlock Arboretum*

a little time to arrange for their transportation. They were too large to go through the Holland Tunnel or on the ferry boats in New York harbor, so a barge was secured to float them down the Delaware, and around by sea. But the stock market collapsed, the purchaser cancelled his order and the trees are still growing, in all their glory, in their old home.

One of the latest additions to the Hemlock Arboretum is a prostrate variety which crawls over the ground. Another miniature one is *Tsuga canadensis minuta*, a little plant which grows about one half inch a year and is now six inches in height.

The white tip variety *Tsuga canadensis albo spicata* comes from a plant some ten feet high growing at the Morris Arboretum which is thought to be over fifty years old. *Tsuga canadensis Jenkinsii* (Bailey) is a quick growing,

small leaved variety with rather sparse pendant branches. Of particular interest is a globose bushy form with at least a hundred stems, its only drawback being its inability to stand up under a heavy weight of snow. But it would be impossible to describe all the many variations of form, size, growth and color. Mr. Swartley's monumental book on the "Mutations of *Tsuga canadensis*" alone contains 382 pages of typewritten material with 245 illustrations. When Cornell University publishes it in book form, as I understand they hope to do, the wealth and beauty and interest of *Tsuga canadensis* and its variations will be a distinct surprise to the horticultural world as well as an important addition to our botanical knowledge.

How old and large do hemlocks grow? In 1932 observing the two hundred and fiftieth anniversary of the coming of William Penn to Pennsyl-

vania, a census was made of the trees which in all probability were growing when Penn sailed up the Delaware. The list of trees of different species numbered 250, and included nine hemlocks. Of these the largest grew in our Wissahickon Valley, about one half mile from the Arboretum. At four and one half feet from the ground it measured thirteen feet five inches in circumference and it was one hundred and twenty-five feet in height. The smallest of the group of nine which were listed was nine feet, eight inches in circumference. As to age, a stump is or was standing in the Tionesta National Forest in Warren County, Penna., that was fifty inches in diameter and had five hundred and sixty annual rings of growth. From Sullivan County, New

York, a reliable observer years ago counted eight hundred rings on a fallen monarch of the forest. The log had been stripped of its bark and allowed to rot.

This article should not close without reference to one of the publications of the Laboratoire Forestier de Toulouse (France) entitled "Revision Du Genre *Tsuga*." It was written by Mlle. F. Flous and is a most painstaking and scientific work. Mlle. Flous lists and describes eighteen species of hemlocks including the nine generally catalogued by the botanist and horticulturists of this country. The new species she describes come mostly from eastern Asia. If and when this old world returns to normal ways there are plenty of virgin fields for the collector and botanist.

LILACS

JOHN C. WISTER

A good many years ago (in January, 1927), I submitted to the readers of *THE NATIONAL HORTICULTURAL MAGAZINE* a check list of lilac varieties, which the editor was kind enough to publish, and by it to place before his readers a kind of chronological history of lilac varieties. I have often hoped that the publication of such a list would discourage some gardeners from using the word new for a lilac which had been in existence for half a century or a century, but certainly I was too optimistic to think that this might happen, for within a week of writing the present article I have received a catalogue from one of our best nurseries listing for the first time—or so the catalogue said—certain varieties of lilacs, which a glance at the above check list would show to have been in existence since 1900 or 1910.

So it seems worth while to reiterate once in a while that the word new in a nursery catalogue means one of three things: either that it is new and listed for the first time, or that it is old and been listed for one hundred years, or that it falls into the period between the two!

Since I last wrote about lilacs for *THE NATIONAL HORTICULTURAL MAGAZINE* it has been my good fortune to have the opportunity to establish a great collection of named varieties of lilacs under the auspices of the Scott Foundation at Swarthmore College. The opportunity was unique because the land available made it necessary to discriminate not between the new and the old, but between the best and the second best, and because I had available, to place in this collection, plants from several private gardens where

only very fine kinds had been grown. It has been interesting, therefore, to see how this collection, which now comprises about 100 varieties, has worked out in terms of years of introduction, that is how many new varieties and how many old ones seem to fall into the really top grade. It has been interesting also to notice the breeders from whom these varieties have come.

It seems to me always that when we begin to consider lilacs that we should think first of the varieties that Lemoine did not originate, because by doing so we call attention to the fact that there are very few of them, and his place as the leader is more firmly established than ever.

Our oldest variety at Swarthmore is *Macrostachia*. It was introduced in 1844, and its originator is not known. This is a very pale pink, fading to white, is one of the most charming of lilacs, and has never as far as I know, been surpassed by any more modern variety. *Marie Legraye* was introduced in 1879 and its originator also apparently is not known, although several names have been suggested. This is a good white with tiny yellowish center, and still remains a favorite with many people, although I personally doubt whether it is worth having when we have such fine modern whites as *Mont Blanc* and *Vestale*. Next, in 1883, came *Ludwig Spaeth*, from the nursery firm of the same name in Berlin. This was for many years accepted as the finest dark purple lilac, and for that reason many people still cling to it, but as in the case of *Marie Legraye* it is doubtful if it is needed when there are so many newer purples with larger flowers. In 1888 the *Baltet Nursery* of

Troyes, France, introduced what is still the pinkest of all varieties, Lucie Baltet. Then in 1892 came perhaps the greatest of all varieties, Mme. F. Morel, from the firm of F. Morel, Lyons, France, and this covers all the varieties of the last century which we have considered worth growing.

Of 20th century varieties from other growers, we have: Mme. Florent Stepman and Reine Elizabeth, introduced in 1908 by Stepman-de Messemaeker, of Brussels; Jan Van Tol, introduced in 1916 by the firm of the same name of Boskoop, Holland, and Ruhm von Horstenstein from Rudolf Wilke, of Berlin, Germany. I mention these only because some one would be unhappy if I left them out, for I am not at all convinced that they are needed in a collection as limited as ours, fine though they are.

Now let us come to the Lemoine varieties, of which we have no less than 74, introduced between the years 1876 and 1939 inclusive. Out of this number but nine were originated in the last century. Let me comment on these, first. The oldest Jacques Callot, was introduced in 1876. Most people have passed it by. On several occasions I have seen it so magnificent that I continue it. The next oldest, President Grevy, 1886, is better known and still one of the best double blues. Virginie, 1888, continues unique, it is a rather dwarf grower, extremely bushy, and its double white flowers have tinges of pink which make it most charming. I would not want to be without it and it seems to me it is particularly important for the small garden. Belle de Nancy, 1891, is a double pink which has held its own through the years, although as with many others it is a question just how many in that color range one would want. Congo, 1897, is one of the most magnificent in bud,

but fades out badly so that at the end of the lilac season it is quite ordinary. But for its beauty at the beginning of the season it certainly deserves its place. Volcan and William Robinson, introduced in 1899, and Georges Bellair and President Viger introduced in 1900, are a little doubtful. All are handsome plants and good flowers, but may not be needed with the great numbers which are to follow.

Let me now consider the first decade of the century, in which in our collection there are 18 varieties, of which I will name only the most important. De Miribel, introduced in 1903, is distinct in color and unsurpassed to this day. It is a slaty blue totally unlike any other lilac, and although in commerce for 38 years it strangely enough has not made much impression, and is not often seen in collections. For its distinct color I believe it belongs in every collection, even the smallest. In the same year a double white was introduced which Lemoine named for Miss Ellen Willmott, the great English horticulturist. Many people consider this the finest of all double whites and that no other are needed with it. It is certain that any other variety which would take its place will have to be very fine.

Waldeck Rousseau was introduced in 1904 and is valuable chiefly for its lateness, and that is true also of Duc de Massa, which was introduced the next year. They extend the lilac season and are valuable for that reason. In 1905 also there were two other outstanding varieties: Reaumur, a single purple, and Rene Jarry Desloges, the largest and handsomest of the doubles. In 1906 came the variety named for the head of the firm, Victor Lemoine, and that must have been a proud year for him. It is a double, as evidently all his favorites were, and is as late as Waldeck Rousseau and Duc de Massa.

and valuable for that reason. In 1907 came Leon Gambetta, long a favorite in this country. I include it for that reason, because I personally have never liked it very much. People tell me it is prejudice on my part, and that I am overly fond of the large single varieties and to apt to criticize the doubles. Montaigne was introduced the same year. 1909 saw the introduction of three important varieties: Hippolyte Maringer, Mme. Anton Buchner, a pale double pink, and Olivier de Serres, perhaps the best of the double blues.

To wind up the decade in 1910 came three more top notchers: Cavour, a variety with some of the dingy slate coloring of De Miribel, but totally distinct from it and useful to plant with it. Vestale, one of the two or three finest single whites, and Marechal Lannes, which when well grown gives perhaps the largest flowers of any lilac in cultivation. This group introduced in the first decade of the present century, is of supreme importance in the garden today, and it is amazing how many people still consider them novelties.

The second decade of the century, 1911 to 1920 inclusive, gives us even more fine varieties, 19 in all, of which I will again mention the most outstanding. Gilbert was introduced in 1911. Because its color is much that of the common lilac, and because if not well grown it does not differ much from it, it has not had the attention it deserves, for under good conditions it sends up most magnificent spikes. Much more popular, however, is President Falieres, which I don't like nearly as well, and which certainly is not needed in any collection which contains Montaigne. In 1912 came Henri Martin, one of our most magnificent doubles, and in 1913 Monge, which all things considered is perhaps the most satisfactory deep single purple. I know

that such a statement will bring much raising of eyebrows, as other people may like other varieties, and there are many other purples to be considered of course. In 1915 came the second of the magnificent single whites, Mont Blanc, which makes such a splendid companion to Vestale but it is later blooming. Any new single white in the future must measure up to these two and it is a hard task. The same year Paul Thirion was introduced, a double exceedingly red in bud and still retaining a good deal of color when the flower is open, finally fading to the color of the common lilacs. Also in 1915 there was introduced Thunberg, an other late variety to add to those mentioned above.

In 1916 came perhaps the darkest of all the varieties, Vesuve, and one which attracts great attention in the garden. I have always been undecided as to its value because it is often such a weak grower. I have quite old plants that are not over 5 feet high, while plants of the same age of other varieties are 10 or more feet tall and across. For those who must have only the most vigorous and do not want to be troubled with varieties at all finicky, this should be omitted, but its omission is a loss because its color is so fine. Emil Gentil was introduced the same year and is one of the best of the double blues, not duplicating those varieties in this color already mentioned. More famous (possibly on account of the name) than either of these, however, is Edith Cavell, a double white. It has a rather creamy tinge distinguishing it from Miss Ellen Willmott, and at its best is one of the most magnificent of all lilacs. In a good many gardens, however, it has a tendency to rather straggly growth and often loses its foliage in late midsummer, and then produces a new crop of leaves with

some flowers in October. It attracts a good deal of attention at this time of year on this account, although of course it cannot be depended upon to do this regularly.

The war year of 1917 saw the introduction of but one variety, Maurice Barres, and this has steadily held its own. After the Armistice, in 1919, M. Lemoine had ready for the public three varieties, which strangely enough are little known: Boule Azuree, Capt. Baltet and Decaisne. In every collection where I have seen them they have been outstanding and have amazed visitors. Yet they are not offered in many catalogues and I do not know of more than half a dozen or a dozen places where they may be seen in this country.

The varieties of the decade 1921 to 1930, ought by now to be well known in this country. There should be many mature plants. Yet comparatively few people know them, and of only one of them as far as I know, are there really large plants to be seen in this country. That one was the first to be introduced in 1922. M. Lemoine had been much impressed with the work that Mr. T. A. Havemeyer was doing in this country, and had wished to name the variety for him. Mr. Havemeyer in his modesty declined the honor, but suggested that it might be named for his wife, and so today it bears the name Katherine Havemeyer. They are large 12 or 15 foot plants of this variety at Mr. Havemeyer's place on Long Island, and on account of the name I have always wished that I liked it better, but like Leon Gambetta, President Fallieres and Montaigne, etc., I cannot get excited over another double of this type.

In 1923 came another single white, Marie Finon, and after 18 years it is still impossible for me to say whether it is as good or better than Vestale and Mont Blanc. The largest plants I have

seen are only 5 feet or so in height, and have been very fine, and when it gets bigger and older and has been tried in more places, it will be time enough to decide about its ultimate value.

That same year there was introduced Massena, which has large flowers on an enormous spike, but like all the varieties I have still to describe, I have never seen very large plants of it nor do I know any one who has grown it long enough to be perfectly sure that it is as fine as it seems to be.

In 1924 Lemoine named his best variety for Marechal Foch, the French war hero. It is a flower of distinctly different type from most of those previously described. The spike is large and more open, the flowers themselves not nearly as large as in the case of Massena, Marechal Lannes and many others. A companion variety introduced the same year is Marengo, which also holds great promise. In the following years there are some varieties which I care to mention at present only by name, and which I certainly can not yet recommend to anyone because it is too soon to tell whether they are first rate or second rate. These are General Pershing, Paul Deshanel, Capt. Perreault, Etna, Archeveque, Crepuscule and Champlain.

I can, however, be more specific about Prodiges introduced in 1928, which is magnificent in every way, and Ambassadeur and Diplomate introduced in 1930. These certainly have already won an important place on their behavior in their first ten years in this country.

The varieties of the decade 1931 to 1939 inclusive, are of course novelties in the real sense of the word. Even abroad their real value is probably not yet known, and certainly in this country with a long period of acclimatization, there is little that can be said about

them except to give the following names to complete the record: Candeur, Firmament, Mrs. Edw. Harding, Rosace, Ani Schott, Monument, Madeleine Lemaire, Georges Claude, Savanarole, Henri Robert, Souv. d'Alice Harding, Gismonda, Monique Lemoine.

From the above lists it can be seen how much the two Lemoines, father and son, have done for the lilac. There are, however, some breeders in this country to be considered, and as their work is comparatively new it is again difficult to know just what to say about them. The first of these is John Dunbar, for so many years superintendent of parks at Rochester. His variety, President Lincoln, raised in 1924, is certainly the finest really blue single lilac, and it deserves a place with the finest varieties which have already been mentioned. Of the 20 or more other Dunbar varieties named and grown in Highland Park, Rochester, it is difficult to know what to say. All of them are high quality but I question how many of them are needed in comparison with the Lemoine varieties that have already been listed. The only one that we have added in recent years to the Swarthmore collection is William C. Barry, which is an introduction of 1928.

Next in point of time of American production, is Mr T. A. Havemeyer, former president of the Horticultural Society of New York. His one introduction which is in American commerce, was named in 1924 for the wife of the New York seedsman and lily expert, W. E. Marshall. In later years Mr. Havemeyer told me he regretted having introduced this variety, as he felt it was not good enough. I am con-

vinced that he was entirely too modest in this as the variety is unique in its deep red purple coloring, and I think will hold its place for many years, even though the individual flower is not over large.

I have been much impressed with a dozen or more Havemeyer seedlings which have not been formally introduced into commerce, which were either named by him, or named shortly after his death. They have not been tried in other places long enough to tell how many of them are of value, but they certainly give great promise. I hope they will have a thorough testing during the next ten years so that we can tell more about them. I shall not name them all but merely mention Night, Zulu, Glory, White Swan and Sarah Sands, as varieties which quite possibly may become famous in the future.

The varieties named by Mrs. Hulda Klager have not made much impression in the East, and while they were at first received with enthusiasm on the west coast it is evident that since the newer French varieties have reached there that these varieties have no longer been felt of the first importance.

There are three or four breeders in our western states who have introduced a few varieties of lilacs, but as far as I know none of them has yet proved themselves of great importance. They are still too new of course for one to give final opinion on them.

These notes cover only varieties of the common lilac. The earlier blooming hybrids have not been considered. They are worthy of a story to themselves.

Philadelphia, Pa.

Day-Blooming Tropical Water-Lilies

IN presenting this series of pictures, it is the intention of your editorial group to carry on the review started last year. With the exception of Enchantress and Shirley Marie, all were grown under amateur conditions and all represent flowers somewhat under the dimensions possible with more generous cultivation.

Alice Tricker, white; Cleveland, a good medium pink; Enchantress, a very fine pale pink; General Pershing, rose color; Golden West, pink over yellow; Imperial, lavender; Jupiter, deep blue purple; Mrs. Buskirk, red violet; Mrs. Sawyer, rose red; Royal Purple, one degree lighter than Jupiter; Shirley Marie, a fine light rose; St.

Louis, clear light yellow; Snow white, a fine white.

Two varieties, Blue Bird, rather much like Jupiter but with more petals and William T. Innes, a most exquisite variety, one degree paler than Mrs. Edward Whitaker when newly opened, are not illustrated.

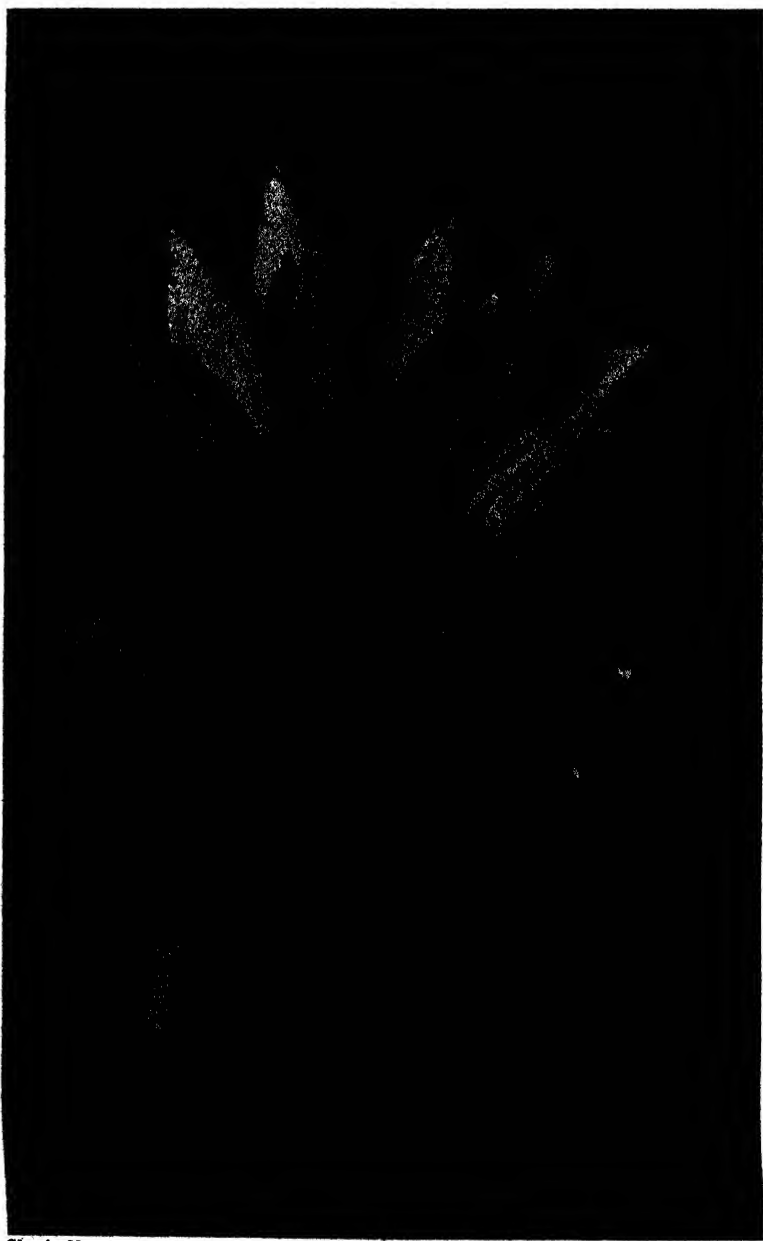
Of the group we should always be glad to grow again, Cleveland, Enchantress, Golden West, Mrs. Sawyer, Royal Purple, Shirley Marie, St. Louis, Snow White and William T. Innes.

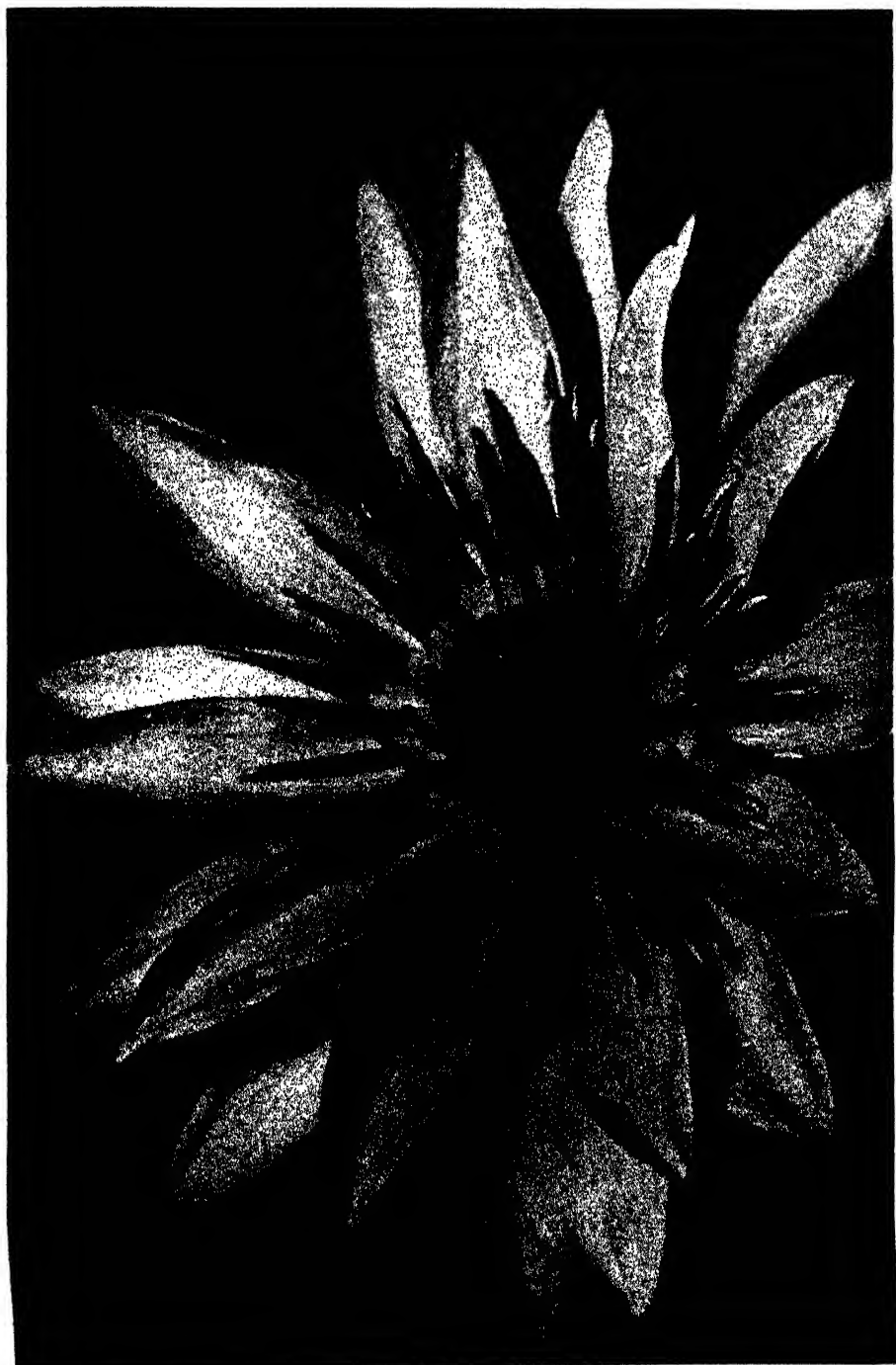
No other group of plants will so reward the gardener in midsummer and the hotter the summer, the greater the reward.



Claude Hope

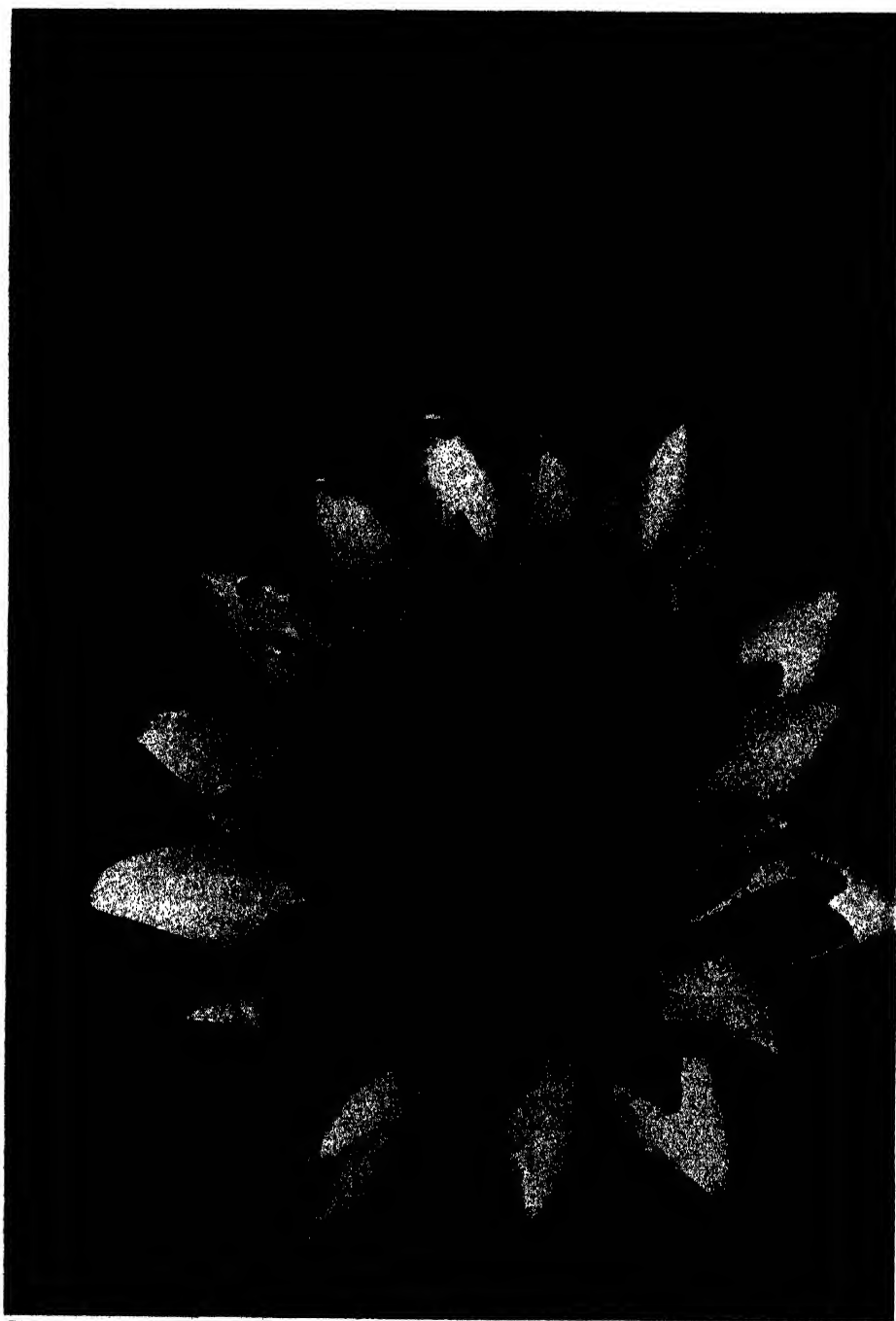
Alice Tricker

*Claude Hope**Cleveland*



Claude Hope

Enchantress

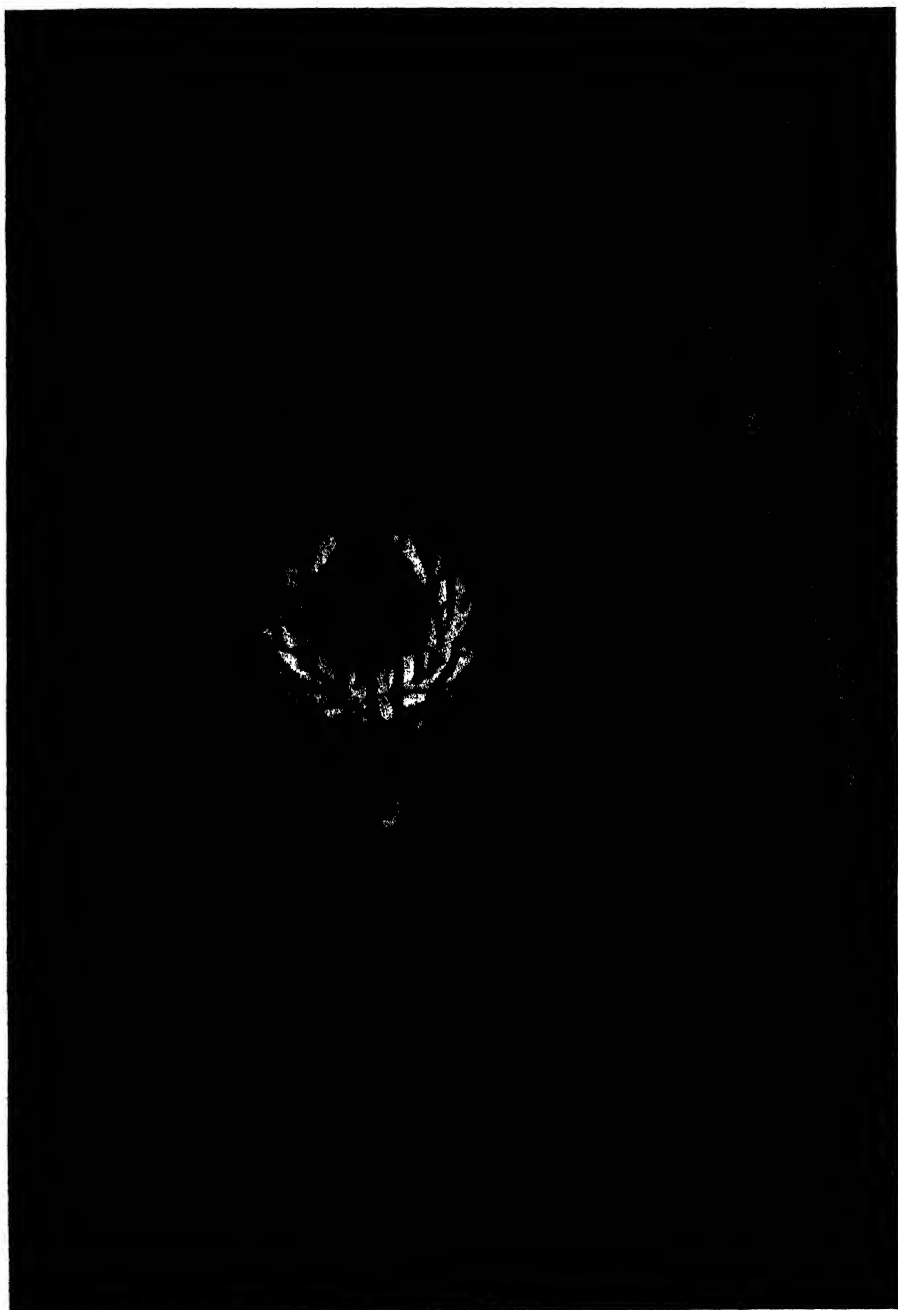
*Claude Hope**General Pershing*



Claude Hope

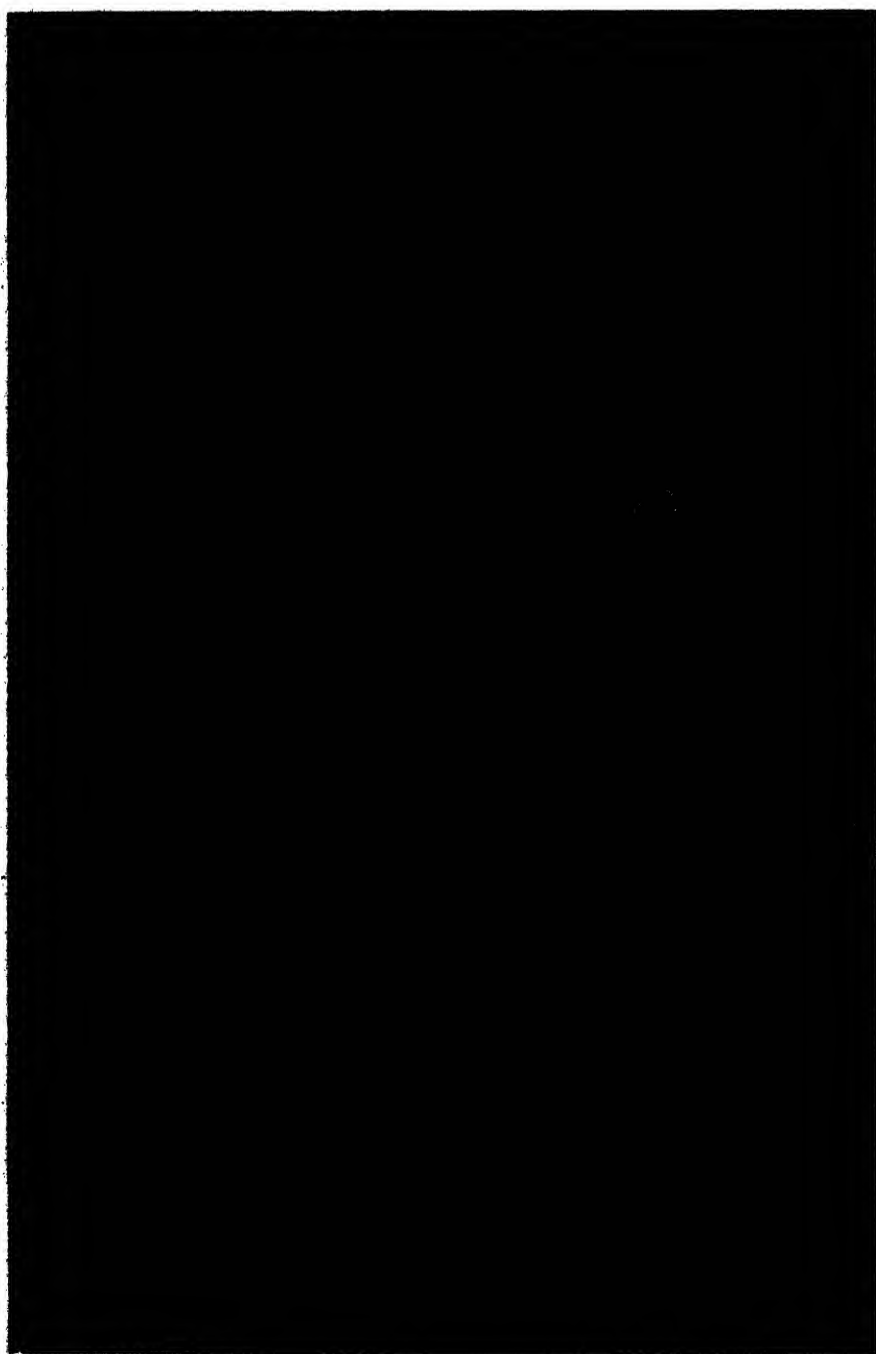
Golden West

*Claude Hope**Imperial*



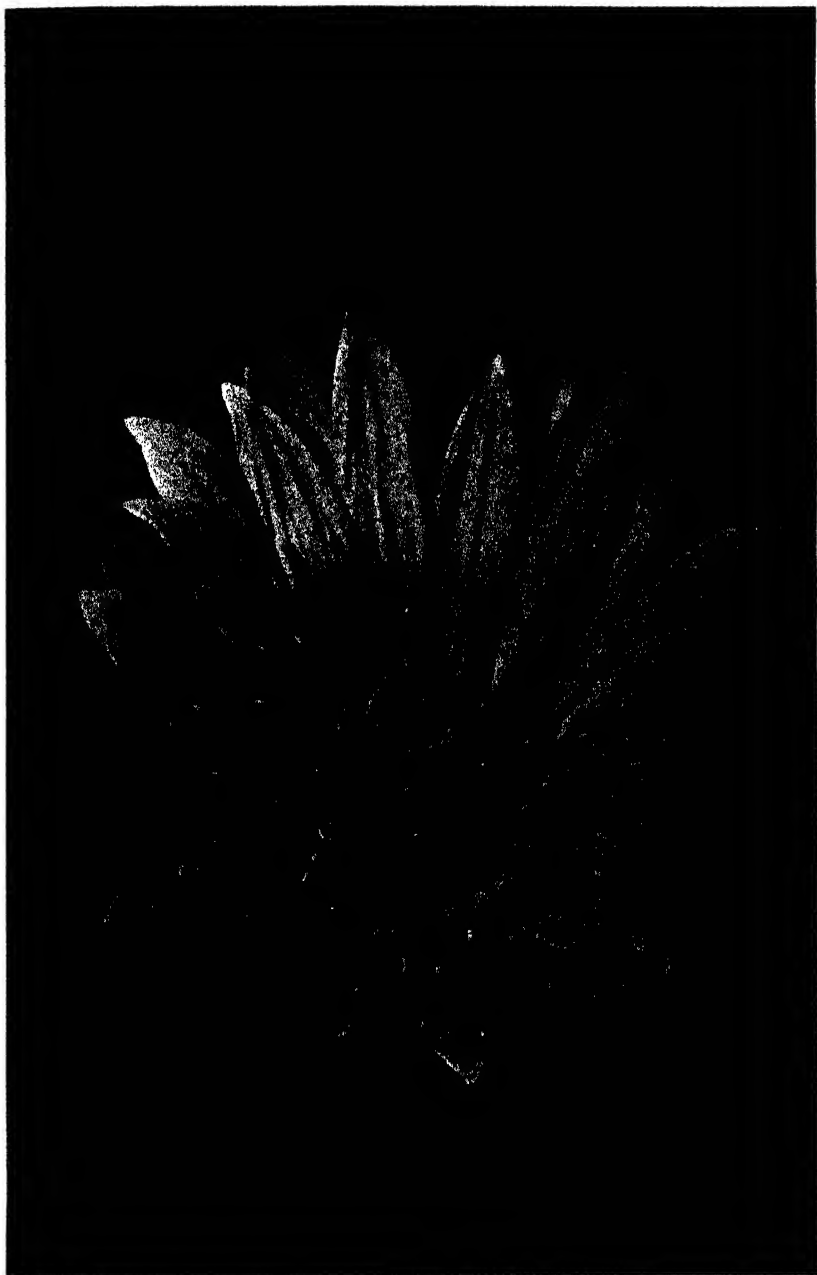
Claude Hope

Jupiter



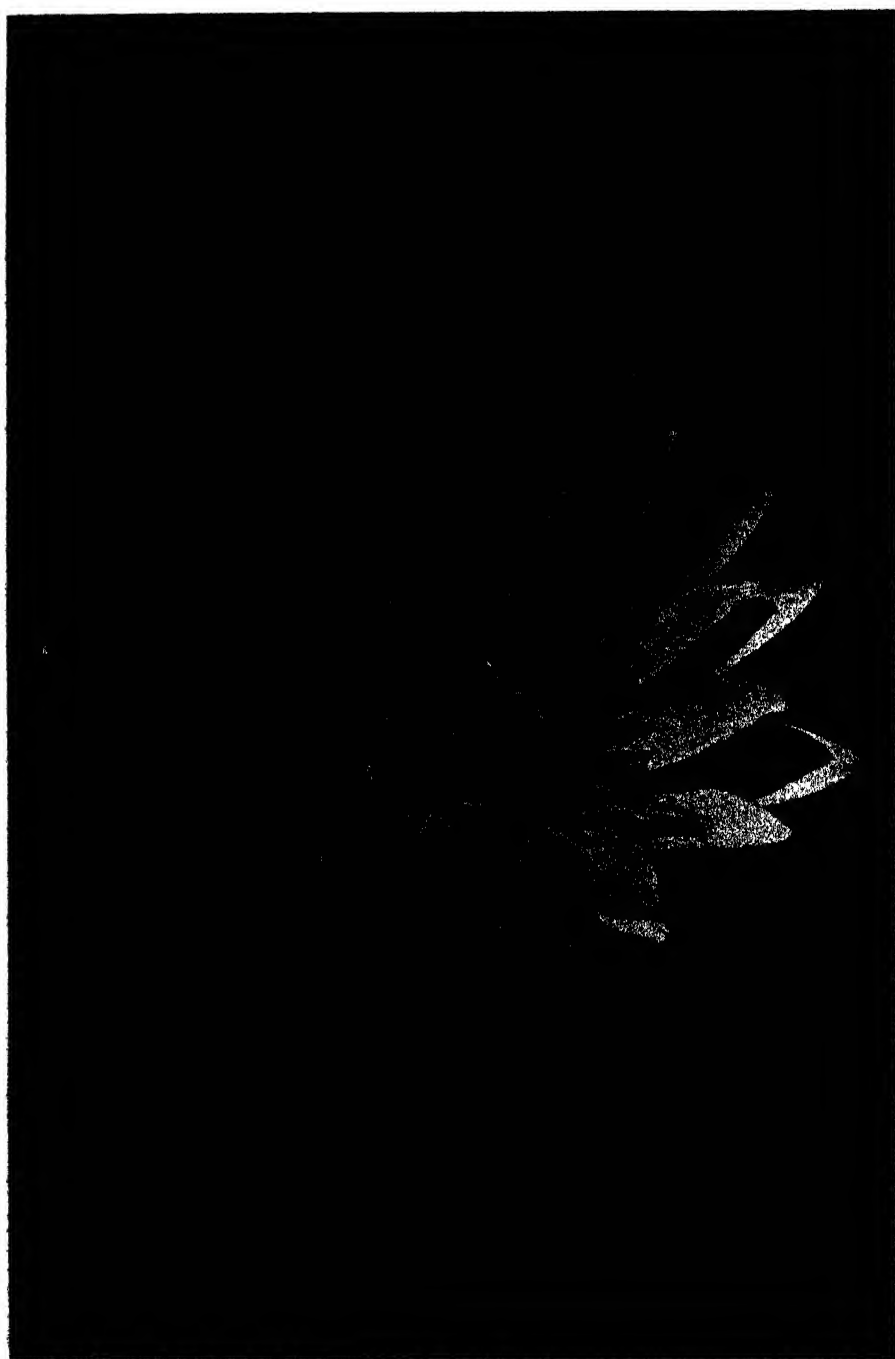
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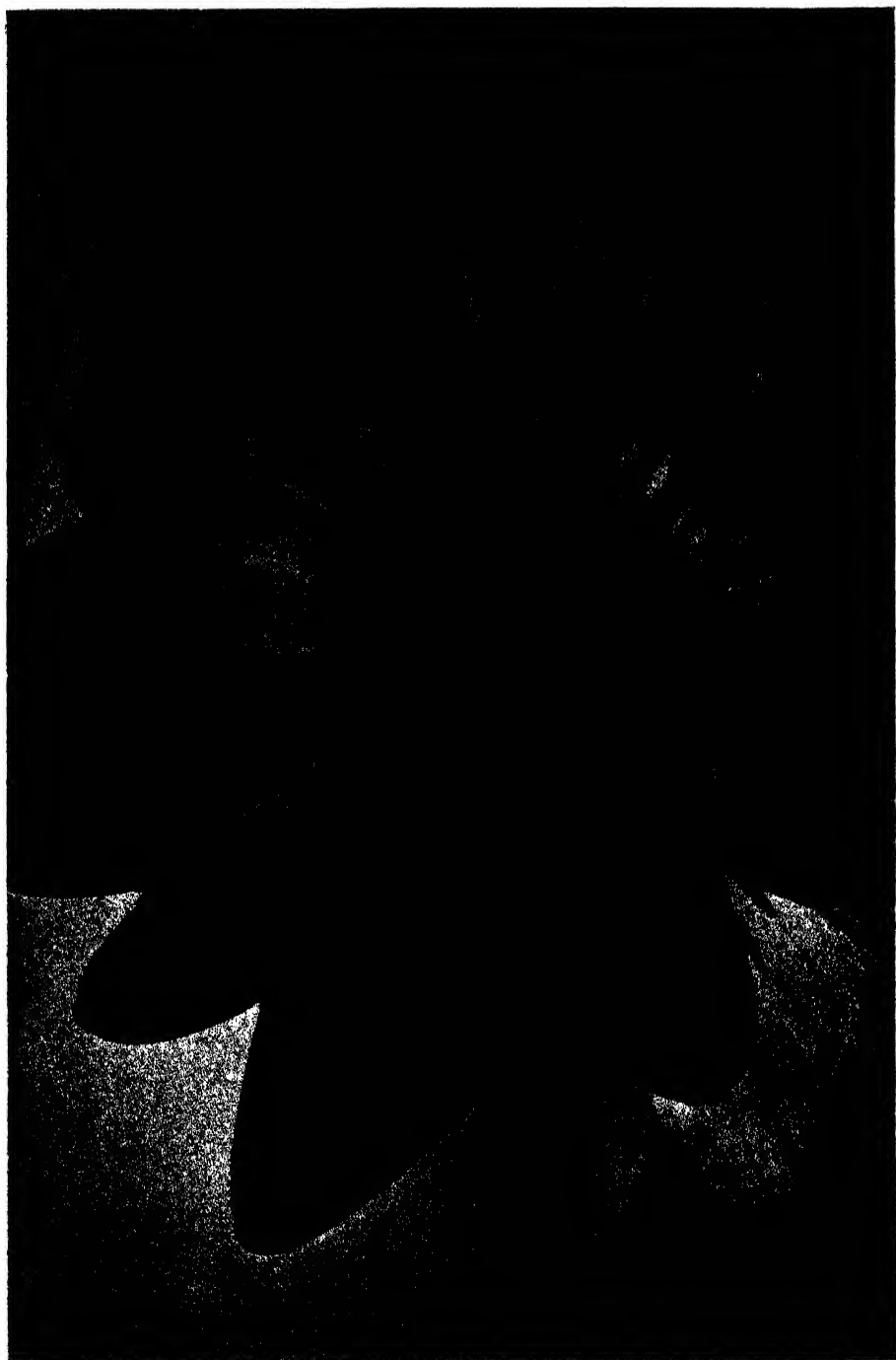
Mrs. Buskirk



Claude Hope

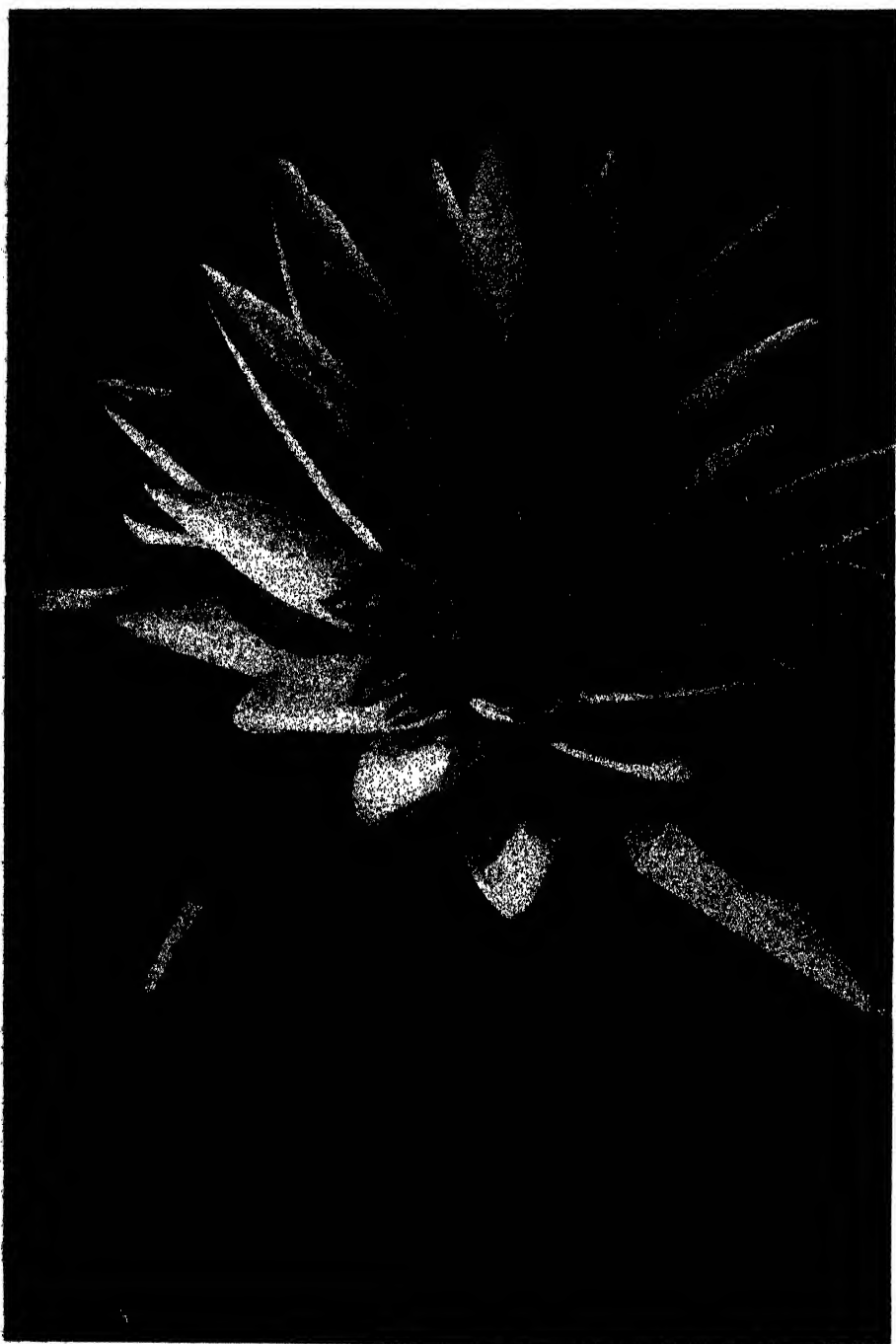
Mrs. Sawyer

*Claude Hope**Royal Purple*



Claude Hope

Shirley Marie

*Claude Hope**St. Louis*



Claude Hope

Snow White

Some Brooms Worth Growing in Gardens

I. *The Scotch and Portugal Brooms and Their Hybrids*

SYDNEY B. MITCHELL

Soon after acquiring my present garden, a couple of acres of dry hillside facing east in the Berkeley Hills about a thousand feet above San Francisco Bay, I began to be interested in drought resistant shrubs demanding little care, hence my ventures with brooms. With the aid of English friends who sent me seeds, a California friend, Hugh Logan of Inverness, who gave me many species he had raised from seed, and a Canadian friend, H. C. Hyland Barnes of Vancouver, B. C., who sent me many hybrid plants not available here, I have been able to try out most of the brooms recommended as worth growing in our gardens. In general they are not long-lived shrubs, so a good many have disappeared from my garden in late years. If they have not been replaced it has been because a good many of the species are somewhat alike and their yellow flowers are not distinct enough to justify their inclusion when we have better species or hybrids in the same color or in a wider range of colors. In this series of notes, therefore, I shall confine myself to the brooms still in my garden and not mention even all of them, excluding the little shrublets and creepers only adapted to rock gardening. I will not, however, leave out any broom because it is not generally hardy. Most of those I mention will withstand any winter up the Pacific Coast as far as Vancouver and many up the Atlantic Coast to Virginia, some of course further. I think perhaps the San Francisco Bay area will satisfy more brooms than any other section of our country because its summers are never too hot or its winters too cold, and drought at

least means drainage, and they don't like wet feet.

When I moved out here beyond the pavement I found the Scotch broom, *Cytisus scoparius*, naturalized (from a neighbor's garden) along the roadside. It has escaped in many areas on the Pacific coast, in Placer County in the Sierra foothills east of Sacramento, in northern Washington and notably on Vancouver Island, where it has become a menace even if a beautiful one. It was too common for gardens, but the descendants of the chance seedling found in Normandy by Dr. Andre, *Cytisus scoparius* var. *Andreanus*, with its yellow wings almost covered in red, was more interested—though more spotty. In the catalogue of T. Smith, Newry, Ireland I found listed creamy yellow selfs and bicolors on yellow or cream grounds and after seeing one of them, Daisy Hill, in a garden near Burlingame I sent for seed of all those available and used the resultant plants for an informal, not to say ragged, hedge between our garden and that of Carl Salbach. These seemed to be exclusively color variations of *C. scoparius*, and though there was some range of color they were not exciting. What I really wanted were the red and the rose and the blends of pink and orange which I found described in named varieties in English nursery catalogues. Unfortunately I could then never find seed of these offered. These were not forms of *C. scoparius* but the second and later generation from a cross made at Kew by W. Dallimore between *C. scoparius* var. *Andreanus* as seed parent and *C. multiflorus* (syn. c.

albus), the Portugal broom, as pollen parent. From one of the four seeds which germinated there flowered in 1902 at hybrid of purplish rose coloring, later named *C. Dallimorci*. It seeded freely, and from it have come the host of named varieties such as Dorothy Walpole, Lord Lambourne, Lady Moore, Donard Seedling, all from Ireland, and the series raised by Burkwood and Skipwith at Kingston near London. For many years these attractive shrubs were not available here as they just couldn't survive the long journey to the United States without soil on their roots.

In 1930 I saw many of these at the Chelsea Show and in private gardens and coveted them for my own place. As commercial growers would not sell me seed I appealed to several English friends, in particular the late Sir William Lawrence, and from them I got about an ounce of seed. From this, sown in flats in October, several hundred seedlings germinated irregularly over some months and were set out direct on a dry hillside, where three years later many of them began to bloom. They were watered only the first summer. An infinite variety of colors and shades were obtained, several, including a pure white, not found in English lists. Because the British and Irish varieties were still unobtainable here I suggested to Victor Reiter, Jr., of San Francisco that he might care to distribute a few of mine, and we then selected out "California," giving the best pink effect; "St. Mary's," pure white; "San Francisco," red; "Stanford," red and orange; and "Pomona," apricot orange, all named for California universities or colleges. These vary considerably in growth and in vigor. The tallest and strongest, Pomona, has been most popular, though I think "California" the nicest of the set. Early

propagation was by grafting on *laburnum*, but later, with the advent of Rootone and other chemical aids to root development it has been found quite feasible commercially to supply them on their own roots, which is preferable. Later Carl Salbach made a few selections from my seedlings less widely distributed, including "Occidental," pink and white, a white and yellow called "Mills," and a quite prostrate all yellow form named "Southern California." More important, I believe, because it is dwarf rather than flat, and of red and white coloring, is the only recent selection from my seedlings, named "McGill" from its having the college colors of my own Canadian alma mater. This if moderately pruned after flowering can be kept under two feet for some years, in my experience. These brooms, like the named varieties from the British Isles, are of such varying vigor and growth they can have quite different garden uses. If one wants a mass effect it may best be obtained by using a number of plants of the same variety so that a fairly uniform height and a common season of bloom will be the result, though seedlings from one type of plant will also give a nice effect and more variety. My neighbor, Professor Sumner C. Brooks, has a dry bank covered with seedlings he raised from "California," and every one is different in color or shade, but the effect is homogeneous. Plants of most of these brooms are in California nurseries and seed may be obtained from Carl Salbach, Woodmont Ave., Berkeley, Calif., the only source I know of in America, so I do not hesitate to mention it.

About the time my own seedlings flowered I succeeded in locating plants of the Irish and English named varieties in Vancouver, B. C., and as these could be imported with soil on the roots "from a contiguous country," I got all

those available. Outstanding were Dorothy Walpole, red; Lord Lambourne, cream and red, tall and vigorous; Donard Seedling, a medium apricot and pink; Goldfinch, cream and pink, almost prostrate; Fulgens, a fine orange and red which I think is probably a pure *C. scoparius* selection, not a hybrid, and Geoffrey Skipwith, which is unique in being the result of a cross between the crimson Dorothy Walpole and *Cytisus multiflorus* (syn. *C. albus*), the Portugal broom. This means it has *C. multiflorus* twice in its parentage and so is distinct in its taller, more slender and more graceful, drooping habit, its smaller flowers and earlier season. On the same account it is probably less resistant to cold, but I know it succeeds in Vancouver, B. C. Its color scheme is attractive, standards white, carmine reverse, wings rosy red. It is very free in flower and seems to need less pruning than the other hybrids.

Cytisus multiflorus, the white Portugal broom, is an old timer in central California gardens though it is too commonly seen as a long, lanky, pendant shrub attractive only in the curtain of small white flowers at its extremity. It is so easily raised from seed that it is always thus propagated—in fact, on a dry bank in front of my house it springs up here and there, flowers in a few years, and here and there dies out just as much. It is shortlived and attractive when young, but hard to keep from looking old and scraggly after a few years, so best replaced at intervals.

A few notes on garden treatment may have some value, though it should be remembered that they are based wholly on personal experience on a hillside above San Francisco Bay at an elevation of 1,000 feet, with the usual minimum winter temperatures in the

upper twenties and the average rainfall, all coming between October and May, about 25 inches. Our soil is a heavy sandy loam with good drainage because of the slope of the land.

Seeds are best sown in flats when they are ripe, from August to October. Germination is slow and irregular, plants beginning to come up in a month and continuing for weeks thereafter. I wait until plants are three inches or so high before moving them into their permanent places in the open ground, a yard apart. If one is not then ready it is best to pot them up because they so resent transplanting that even where successful it sets them back a year or two. Propagation from cuttings is best done from July to October, using half ripened tips of the newer growth, dipping them in Rootone, knocking off any excessive powder by tapping on a pot, and then inserting them two-thirds of their length in a hole made by a pencil or stick in the sand beneath a glass frame, or in a greenhouse bench. Rooted cuttings must be potted up and grown on until spring or summer before it is well to plant them in the open ground.

I have found these hybrids require an annual pruning right after flowering to cut down the strain of ripening a terrific seed crop and to stimulate the new growth from which next season's flowers will come from March to May, depending on the variety. They also enjoy an occasional heavy watering where summers are rainless as here. They have not proven adapted to the hot summers of interior southern California, where they suffer extremely from infestations of aphids, but where happy they are most effective and colorful shrubs.

Berkeley, Calif.

Sphagnum for Seed Germination Inhibits Damping-off Losses on Unsterilized Soil¹

VERNON STOUTEMYER, CLAUDE HOPE AND ALBERT CLOSE

LIVING sphagnum moss has been used as a medium for the germination of nearly all seeds received at the U. S. Plant Introduction Garden at Glenn Dale, Md., for the last 15 years (2). During this period, plants of an estimated minimum of 2,500 species have been successfully started in this manner. Complete control of damping-off has been obtained with all these species and throughout this period. This remarkable record, however, was not supported by direct quantitative comparisons with conventional seeding media until 1940. When these tests were made, the cheaper and more generally available commercial baled sphagnum was compared also as a substitute for locally gathered living sphagnum.

Search through standard horticultural literature has revealed very few instances of the use of sphagnum for seed germination. Burbidge (1) recommended living sphagnum for germinating seeds of orchids and *Nepenthes*. Hatfield (8) favored the use of a one-sixteenth inch layer of fine dried sphagnum over soil for seeds of ericaceous plants and for very fine seeds. Craig (3) suggested essentially the same method. Morrison (7) used dried sphagnum to cover seeds of azaleas sown on compost. Doran (4) compared a mixture of equal parts of sand and sphagnum, a like mixture of sand and peat, sand, and soil for the control of damping-off. His results showed that the first three gave very good, but

not complete, control with little difference between them.

In the experiments reported here the dried sphagnum came from Wisconsin. The living sphagnum came from local bogs. The seeds tested were chosen to cover a wide taxonomic range and to include species generally regarded as particularly susceptible to damping-off.

The preparation of the sphagnum was that described by Close (2). The living sphagnum was dried enough to facilitate handling, but not enough to kill it. The commercial dried sphagnum was sometimes moistened slightly before handling, but this step appears to be optional. Following these preliminary steps, both kinds were rubbed through a screen of hardware cloth having three meshes to the inch. With both kinds of sphagnum, this was an easy task.² The flats used in these tests were usually made of new white pine, 20 by 10 by 3 inches, with provision for drainage. In most of the experiments, the flats were first filled to within 1¼ inches of the top with a mixture of two parts of imported peat and one part of sand. The loose moss was added to fill the flat, then firmed to bring the surface one-half inch below the top. As a final step, the flats were well watered, but sometimes not until after sowing. In order to insure a thorough wetting of the sphagnum, a second watering within 12 to 24 hours was decidedly helpful. No sterilizing or antiseptic treatment was ever given either to the sphagnum or its substratum.

¹Full details of this work will be published in the Proceedings of the American Society for Horticultural Science for 1940 under the title: The Control of Damping-off by the Use of Sphagnum for Seed Germination.

²Many people have indicated that this sounds like an impossible task. On the contrary, sphagnum is very readily rubbed through the coarse screen.

For comparison with the sphagnum, flats were prepared with: (1) washed river sand receiving Dunlap's (6) simple two salt nutrient solution—one teaspoonful each of superphosphate and potassium nitrate per gallon of water in an amount sufficient to saturate the material; (2) a mixture of one part sand and three parts of composted sod loam which had been steam-sterilized some weeks before and stored in a bin; (3) a mixture of two parts of imported peat and one part of sand.

In all the flats, the seeds were broadcast over the surface and received no other cover than a pane of glass placed over the top of the flat. Until germination, they were protected from direct sunlight on an open bench in a propagation house. As the seedlings developed, air was admitted gradually.

In the first experiment, one-third of each flat was devoted to a different seedling medium, which was again divided in half by a line of sand to provide duplicate sowings. Strips of glass separated the media. The flats were sown April 17. On May 6, 19 days after sowing, and on May 20, 33 days after sowing, the seedlings were counted. The flats were held under observation for several more weeks but there was no appreciable change. The graph set forth in Figure 1, showing the seeds tested and the relative stand, is drawn from the combined seedling counts of both plots of each medium. It shows the ratio between the best total for each species, considered as 100 per cent, and all other totals for that species.

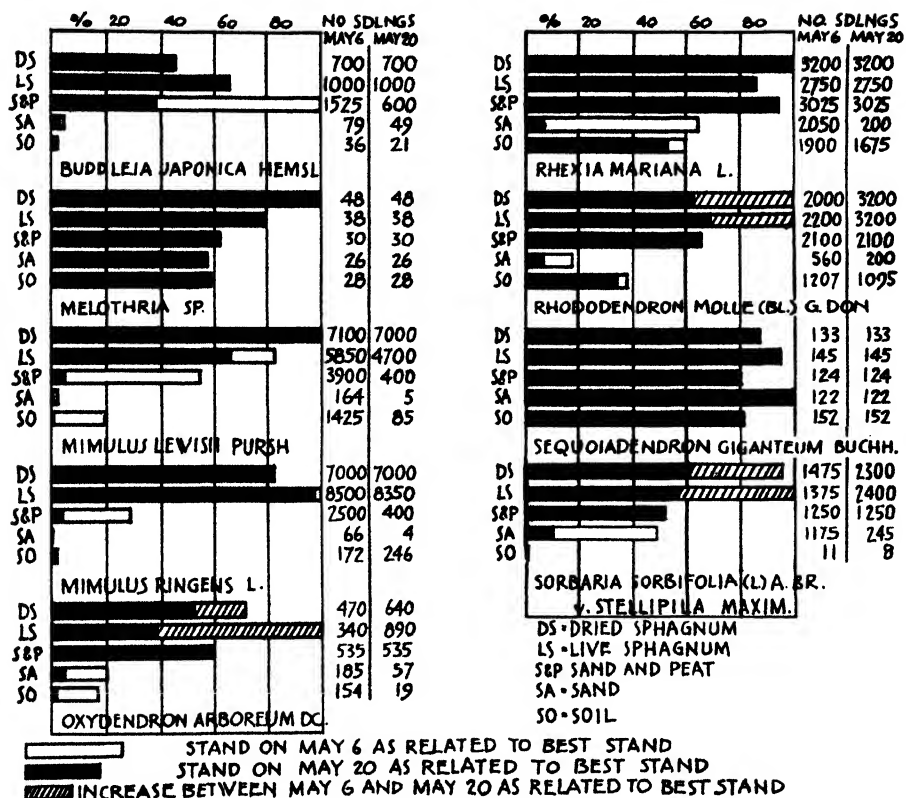
Spontaneous attacks of damping-off, which spread rapidly from the center of infection, were observed in the following: *Buddleia japonica*, *Mimulus Lewisii* and *M. ringens*, and *Sorbaria sorbifolia* on sand, soil, and sand and peat; *Oxydendrum arboreum*, *Rhexia mariana*, and *Rhododendron* on sand and on soil. The difference shown in

Figure 1 between the stands of May 6 and May 20 gives a measure of the extent of this loss. In no case were attacks observed on either of the sphagnum media, although there were on them some slight losses of undetermined origin in *Mimulus Lewisii* and *M. ringens*. As shown in Figure 1, seeds of several species continued to germinate on sphagnum after May 6.

On these unsterilized media, it is clear that sphagnum, either living or dried, was superior from every point of view. Furthermore, dried sphagnum was fully the equal of living sphagnum. In fact, the plants were actually larger and greener in the former, suggesting that the products of disintegration were stimulative.

In order to compare unsterilized sphagnum with the other media at their best, another greenhouse test was made. All flats except those containing sphagnum were subjected to steaming, after preparation, for 45 minutes at a pressure of about 50 pounds. In addition, flats of living and dried sphagnum, watered with Dunlap's two-salt solution, were included. Seedling counts were taken, but as no damping-off was observed in the sphagnum and the differences in stand were small, they are not given. Suffice it to say that the most satisfactory media in this series were sterilized soil and the sphagnums, particularly those to which nutrients were added. Again dried sphagnum was fully as good as living sphagnum. The only occurrences of damping-off were in sand and in peat and sand.

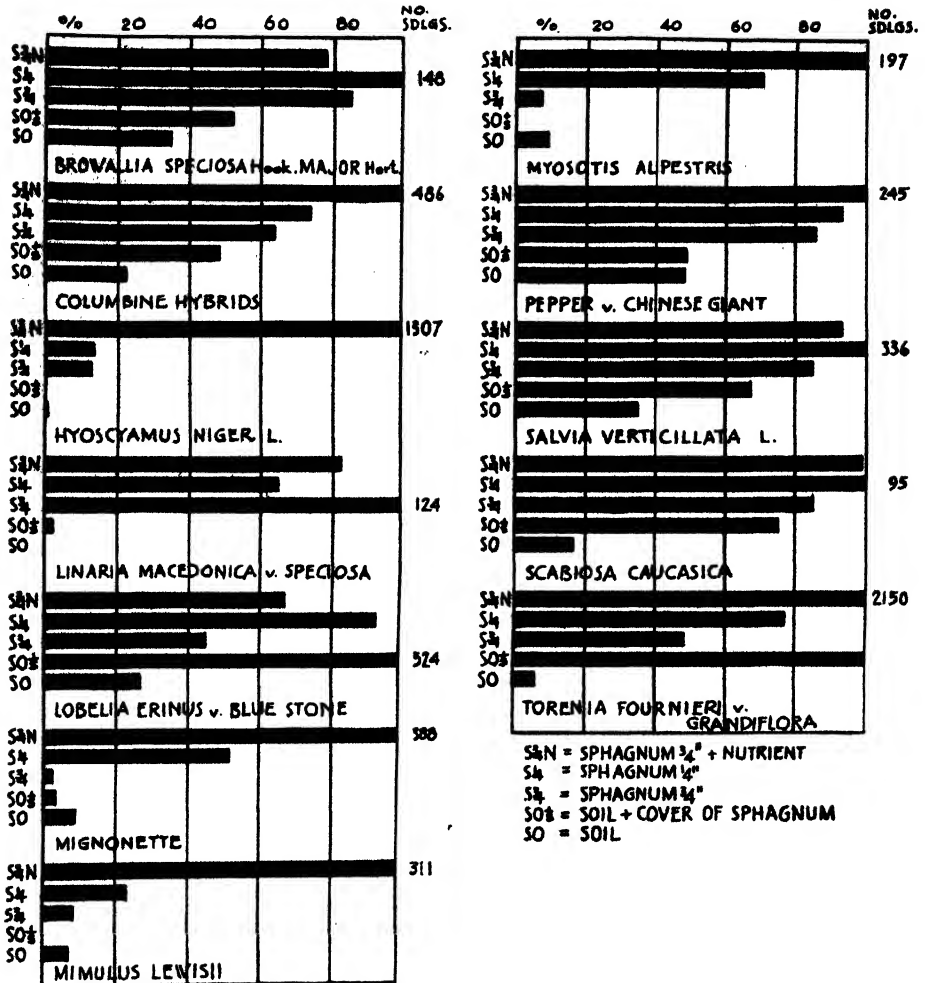
In April, 1940, dried sphagnum was given a rigorous trial in a small unheated greenhouse, using it in association with the same soil and under the same conditions which in other years had led to the loss of a high proportion of the seedlings from attacks of damping-off. Unfortunately, in this sowing,



The effect of various unsterilized media on the stand of seedlings in the greenhouse. For each species, the medium which gave the highest total number of seedlings regardless of the date of count, is taken as 100 and all other media related to it. In the column to the right of the diagrams the seedling counts are given.

no comparisons were made with other media, but the results were so highly successful as to warrant comment. A layer of sphagnum about half an inch thick was placed over unsterilized garden soil with a high humus content. The seeds were sown thickly in a band about an inch wide and an inch apart. After sowing, and at occasional intervals of 5 to 7 days, nutrient solution was used instead of water. The situation was such that the flats could be attended only early in the morning or late in the afternoon. In 40 lots of seed belonging to the genera *Adonis* 2 spp., *Alonsoa* 3 spp., *Amberboa*, *Ami-*

mi, *Arnebia*, *Asperula*, *Boltonia*, *Brachycome*, *Browallia* 4 spp., *Centaureum*, *Charicis*, *Collinsia* 3 spp., *Crepis*, *Downingia*, *Eucnide*, *Felicia* 2 spp., *Gamolepis*, *Hebenstreitia*, *Heliophila*, *Ionopsidium*, *Mimulus* 6 spp., *Nemesia*, *Nolana*, *Penstemon*, and *Trachelium*. germination was very good with all but *Arnebia*, *Asperula*, *Hebenstreitia*, and *Charicis*. Only a few seeds of each of these latter were available. The seedlings were held in these flats until they could be transplanted to the open garden. Only one center of damping-off appeared, in one of the rows of *Mimulus*; it spread so



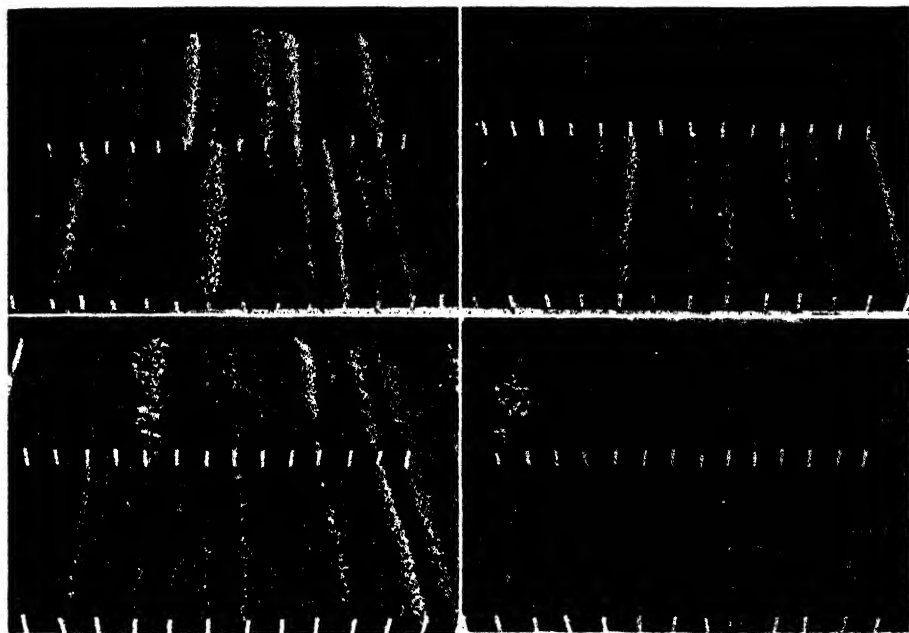
Germination on sphagnum and on unsterilized soil in the cold-frame. For each species, the treatment which gave the highest total of seedlings is taken as 100 and the others related to it.

slowly that after two weeks it was not more than two inches across. It is worthy of note that the seeds of *Trachelium caeruleum* in this sowing did not germinate until a month later, but at that time a very good stand was obtained.

So much success had attended the use of sphagnum in the greenhouse that it seemed worth a trial in the cold-

frame. Accordingly, a frame was selected in which damping-off organisms had been active enough earlier in the season to destroy entirely all sowings made there. Colorimetric determinations indicated a pH of 4.3 for the soil; sphagnum usually shows pH of about 4.4 to 4.5.

On July 22, four plots, each 6 feet wide, were laid out. Dried sphagnum,

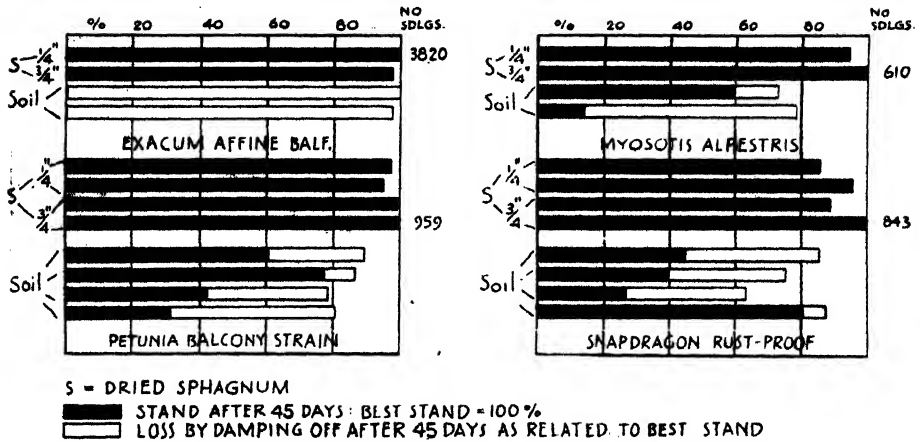


The cold-frame plots one month after sowing. Upper left: sphagnum in a layer $\frac{3}{4}$ inch thick to which nutrients were applied several times. Upper right: sphagnum in a layer $\frac{3}{4}$ inch thick. Lower left: sphagnum $\frac{3}{4}$ inch thick. Lower right: unsterilized soil.

screened as outlined above except that the preliminary moistening was omitted, was spread loosely to a depth of about three-fourths of an inch on two of the plots and about one-fourth of an inch on one plot and well watered down with a fine spray. The fourth plot received no sphagnum. Immediately after, the seeds were planted in duplicate with random arrangement in bands 1 inch wide and 30 inches long, spaced $3\frac{1}{2}$ inches apart. A light covering of sphagnum was placed over the larger seeds in the sphagnum plots, and a covering of soil was used for the same seeds in the soil plot. On July 26, another plot was added, adjacent to the soil plot. In this case, the seeds were sown on the soil but received a covering of sphagnum, varied in thickness according to the size of the seed. Dun-

lap's nutrient solution was applied to one deep sphagnum plot two days after sowing and repeated three times at about 5 to 7 day intervals. After sowing, the frame was closed tightly with glass sash, which in turn was covered with coarse burlap shade. As soon as most of the seeds had germinated, the sash was replaced by a screen wire shade. Unusually high temperatures prevailed during the period between August 2 and August 10. A maximum thermometer in the frame registered over 100° F. on several occasions during this period.

The kinds of seeds sown, the resulting numbers of seedlings counted on August 21, and the rank of the plots are shown graphically in Figure 2. There was little evidence of post-emergence damping-off, but numerous



Germination and damping-off survival on contaminated soil and on sphagnum in contact with the contaminated soil in the greenhouse.

observations gave positive evidence of pre-emergence attacks in the two plots with seeds in contact with the soil.

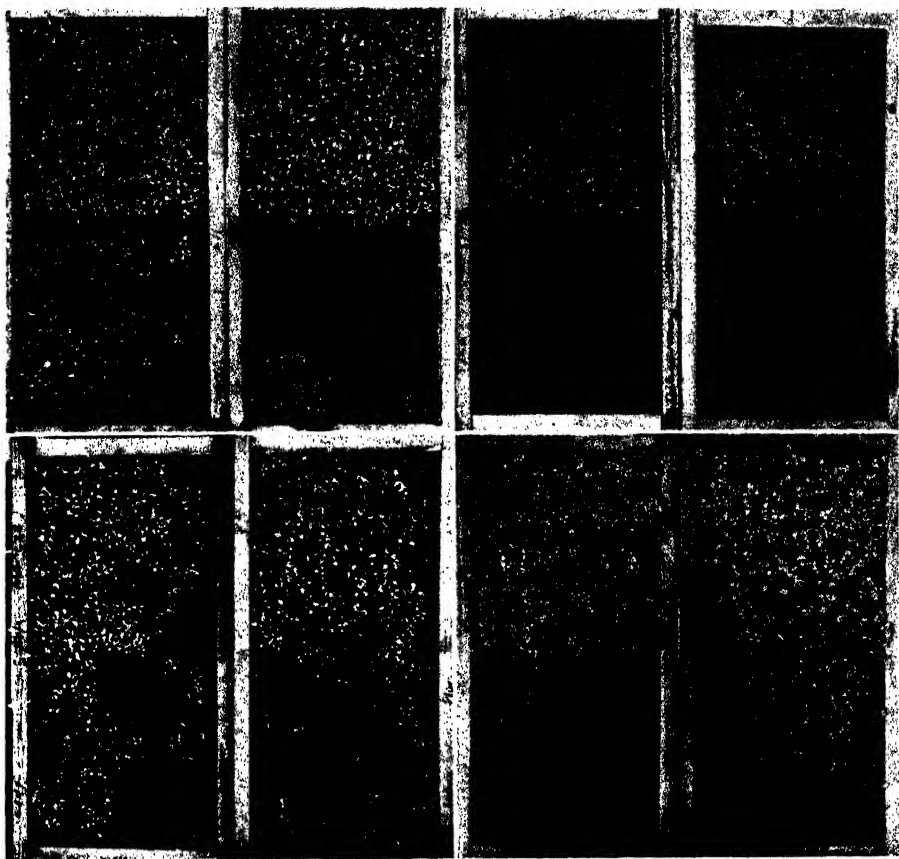
The margin by which the sphagnum surpassed unsterilized soil in this trial was most impressive. (See page 113.) In fact, the difference was that between a successful germination and a virtual failure. This same difference was reflected in the character of the growth of the plants. Only in a few scattered tufts of plants was the growth of the soil plot equal to that of sphagnum plus nutrients. In the plot where the seeds were sown on soil and covered with sphagnum, few of the seedlings made good growth, possibly because the roots failed to penetrate the soil and there was too little sphagnum to provide adequate moisture.

The number of surviving seedlings seemed to be increased by the application of a weak nutrient to the sphagnum. It is possible that the superior stand on the thin sphagnum likewise may have been due to nutrients diffusing upward from the soil. The seedlings on the thick layer of sphagnum which did not receive nutrients were definitely inferior in appearance, al-

though, on the whole, their germination was satisfactory.

As the first experiment in the cold-frame drew to a close, a somewhat more extensive trial was inaugurated, designed to permit a comparison with soil under conditions more favorable to the latter. However, due to unusually favorable weather for the germination of seeds, very little was learned. For the most part, a few more seedlings were obtained in soil that was steam-sterilized just before planting than on sphagnum. There were a few instances of slight loss by damping-off in sphagnum, but there was no spread of any extent.

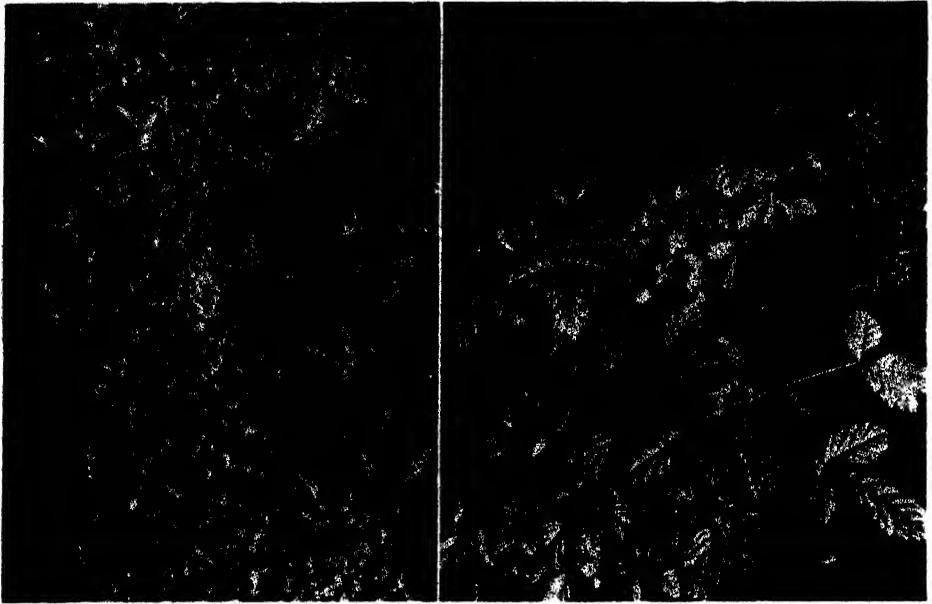
In order to test further the capacity of sphagnum to inhibit the spread of damping-off, one half of each of a series of twelve flats was filled with untreated soil taken from the soil plot used in the first coldframe experiment. The other half of six of the flats was filled with the same soil to within three-fourths inch of the same level, and brought to level by a layer of three-fourths inch of screened, dried sphagnum. The junction between the soil half and the sphagnum half was closed carefully so



Flats of seedlings comparing the stand on soil with that on sphagnum contact with soil 45 days after sowing. In the upper half of each flat, the seeds were sown on a layer of sphagnum lying in contact with the soil. In each pair, the flat on the left received a layer $\frac{1}{4}$ inch thick, that on the right $\frac{3}{4}$ inch thick. Upper: left, *Myosotis alpestris*; right, *Exacum affine*. Lower: left, *petunia*; right, *snapdragon*.

that nothing separated the two media. The remaining six flats were filled in the same way except that the sphagnum layer was only one-fourth inch thick. The flats were sown on November 10 with the soil portions and the sphagnum portions receiving equal quantities of seed. Four flats were sown with petunia and four with snapdragon seed: two on each thickness of sphagnum. Similar comparisons were made with two flats of *Myosotis alpestris* and two flats of *Exacum affine*.

In Figure 3, the soil and sphagnum plots are compared for initial germination and for damping-off losses within 45 days after sowing. For the most part, germination was slightly poorer on the soil. Damping-off took almost all the seedlings of *Exacum affine* on soil. (See page 116.) A large portion of the petunia seedlings on two soil plots was killed by damping-off. One soil plot of myosotis likewise suffered heavy losses. Some losses on soil occurred in the other flats of petunia and



Seedlings which have remained in the sphagnum for four months. Left, Vitex sp.; right, Anaphalis royleana. About 500 seedlings were transplanted from the space at the right.

in all those of snapdragon. There was no evidence of spread into sphagnum in any flat, although in two cases with petunia, large circles reached the sphagnum. There were no losses on the sphagnum that could be attributed to damping-off. No distinction could be made between the two thicknesses of sphagnum.

Experience with the use of living sphagnum for seeds that are slow to germinate has shown that damping-off is prevented even after several months. The living sphagnum, however, tends to grow and thus submerge the seedlings. Observations on the suitability of dried sphagnum in this respect have been limited. In one instance a species of *Swertia* germinated without incident about two months after sowing. To test the keeping qualities of sphagnum, two flats of dried, and two of living sphagnum in three-quarter inch layers

over unsterilized sand and peat were prepared and watered on August 10 as if for immediate sowing. One flat of each was watered with the two-salt solution. They were covered with panes of glass, set away on a light bench, and kept moist. On November 8, each flat was marked off into six equal plots of 6 by 4 inches and sown in duplicate with measured quantities of seed of snapdragon, petunia, and torenia. The condition of the surface of the dried sphagnum appeared to be better than that of the living, although the latter had grown very little. There was an application of nutrient solution to all flats immediately after sowing.

The number of seeds sown per sample and the percentage germination as determined December 10 are shown in Table I. No post-emergence damping-off was observed in any of these plots. The same lots of petunia and snap-

TABLE I.—Stands of Seedlings after One Month on Unsterilized Sphagnum Prepared Three Months before Sowing

	No. of Seeds Sown	SEEDLINGS PRODUCED IN PER CENT							
		Living Sphagnum	Living Sphagnum + Nutrients in August	Dried Sphagnum	Dried Sphagnum + Nutrients in August				
Petunia, Balcony Strain	750	24.0	21.9	26.8	25.9	35.7	33.1	29.6	34.4
Snapdragon	325	46.2	51.7	40.6	33.5	57.8	51.4	55.1	54.2
Torenia Fournieri	975	92.8	74.9	75.4	75.4	63.6	83.1	90.3	72.3
Means		60.2	51.8	52.1	50.6	52.5	59.8	62.5	55.6

dragon seed, when sown on freshly prepared dried sphagnum at the same time and handled in the same manner, yielded germination percentages of 35.2 and 69.9 respectively. No reason has been assigned for the slightly reduced germination on the old surfaces.

In the use of sphagnum at Glenn Dale, it has been demonstrated repeatedly that seedlings germinated on live sphagnum may be kept alive for months in the original seed flat with very little care. It appears after one season's experience with dried sphagnum that the same may be expected of it. Certainly, seedlings of a number of species have been held successfully on it for four months. (See page 118.)

Sphagnum had two advantages over most media not shown in the experimental data given above. It permitted the removal of either small or large seedlings for transplanting with a minimum of injury to the roots. Some seedlings were merely lifted out. Larger ones were easily pulled out. It permitted great latitude in watering. In the greenhouse, it required very little water. In the coldframe daily watering was necessary, but it could be done without fear of the unfavorable reactions that accompany overwatering in the soil. Furthermore, rains did not harm the surface.

Judged purely from the standpoint of the control of damping-off, sphagnum is greatly superior to the other

unsterilized media tried. Compared with sterilized soil under favorable conditions, its only advantage is simplicity. Furthermore, contaminations of sterilized soil are always possible.

Sand as a medium has been recommended by Dunlap (5), but in the trials at Glenn Dale, it has not furnished adequate protection against damping-off unless sterilized. When sterilized, it does not appear to have any particular advantages over sterilized compost. Furthermore, it does not hold water as well as either sphagnum or compost. Mixtures of peat moss and sand have been recommended as seeding media by Wiggin (9). However, the mixture tried at Glenn Dale has been inferior to sphagnum.

For the home gardener and the small greenhouse operator, the use of sphagnum obviates the expense of soil sterilization and the uncertainty of chemical treatment in seedling cultures. When it becomes necessary to germinate seeds with which the gardener is not familiar, sphagnum is helpful. Should the seeds fail to germinate immediately, they are readily accessible for examination and recovery, if need be, for stratification or other stimulative treatment. Preliminary tests indicate that dried sphagnum may be prepared by machinery for sowing in large-scale operations.

Without sterilization of seed or substrate, and with little attention to wa-

tering, sphagnum has given as good results as any other good medium regardless of treatment. The diversity of plants used in these tests, covering a great taxonomic range, promises wide suitability of sphagnum to seed of various kinds. In other requirements of a germinating medium, it is always equal, and generally superior, to soil and to sand.

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Tuberous Begonias

LAMBERT DAY
The American Begonia Society

The modern or popular form of our tuberous begonias are winning new friends wherever they are seen. I wonder, as we gaze at their exquisite forms and colors, if we half appreciate the amount of work and skill that has been employed to produce these flowers. It has taken over eighty years of constant labor on the part of many hybridists. This means that several generations have been devoting their best energy and thought in this development. The job is as yet by no means complete and the hybridist is still silently and patiently at work, creating new forms, or removing defects from old ones, adding a delicate fragrance and changing growth habits to conform to our modern mode of civilization.

The ancestors of our tuberous begonias came from South and Central America. They were found growing at various altitudes between two and twelve thousand feet. This means that they are found growing in a temperate zone and require the duplicating of these cool conditions to be at their best. Mr. Henderson is credited with introducing the first tuberous begonia into England. This he received from Bolivia, and grew it under the name of *B. cinnabarina*. By 1854 *B. Pearcei*, *B. octopetala*, *B. Veitchii*, *B. Davisii*, and *B. roseaefolia* were in the cultures of the early hybridizers. Within ten years the first double flower made its appearance. From within this group came all of our present color and most of our present forms.

Hybridists have developed the begonia along three different lines. First, are those commonly called, "Lloydii," which were developed for use in hang-

ing baskets, and are available in yellow, red, and white, with intermediate shades. The flowers may be selected from singles or doubles, and large or small to suit the taste of the individual. The second group are the "Multiflora," which are unexcelled for profusion of bloom in brilliant color. They are compact growers, seldom reaching more than fifteen to eighteen inches in height. With some varieties the foliage is to be scarcely seen because of the dense bloom. This form deserves much more popularity than it has had in the past in this country. It may be used as a bedding plant and will stand more sun than other types.

In the third grouping are our regular tuberous varieties. These may be had in all varieties of color except shades of blue. The flowers have been developed into many pleasing forms among which are "Narcissiflora," "Cristata" and "Crispa" in the single flowered types. The double flowered include "Camellia," "Camellia Picotee," "Frimbriata," and "Rosebud" types. No garden or conservatory is complete without at least a few of the latter group.

These plants may be started from the dormant tubers procurable from most seed supply houses and nurseries during the months from December to March, at other times from nurseries as potted specimens. The dormant tubers should be kept at all times in places where they will not freeze. Temperatures between 50 and 60 degrees Fahrenheit are satisfactory. When the tubers begin to show pink sprouts it is time to start them on their first cycle of growth.

A very good way is to place them so

that they are just flush with the surface or slightly buried in moist peat moss. Spacing the tubers about three inches apart will allow ample room for root growth. The peat moss should be in a shallow box or seed flat about two and one-half to three inches deep. The tubers may then be given gentle heat in the greenhouse. For those that do not have a greenhouse, it is advisable to mix sharp sand and oak leaf mold in equal proportions with the peat moss as less water will be retained by this mixture. This will help prevent rotting of the tubers and young, tender growth. This mixture should be kept just moist and never allowed to become soggy. The flat should then be placed where it will receive plenty of strong filtered sun light but no direct sun. Night temperatures should not drop below 50 degrees Fahrenheit, while daylight temperatures may be allowed to rise to 75 degrees Fahrenheit. Warmer temperatures are liable to cause a more rapid, spindling growth. This is an undesirable condition because the plants are more readily attacked by diseases, and the succulent growth will not produce as many nor as large flowers as the plant that is allowed to start slowly with the resultant compact growth.

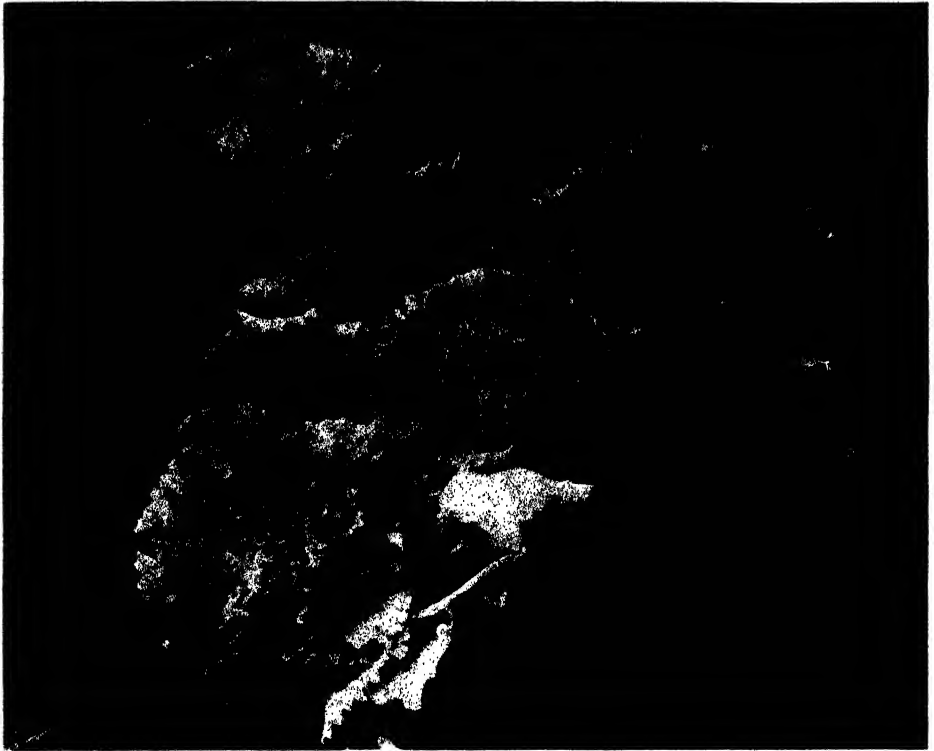
When the growth has reached a height of four to six inches and a good root system has developed it is time to transplant them. If placed in small pots, select a pot of the size that will allow the ball of roots to be within an inch of the edge. Fill the first quarter of the pot with good drainage material or sphagnum moss. The rest of the pot is filled with a soil mixture suitable for begonias. The tuber may be covered with soil only up to the first joint on the stem. Care should be used not to cover this joint as a new tuber will form at this place, and the old one will be destroyed. The plant may or may

not flower during this period and a very sickly plant with a small tuber may result or total loss of the plant may follow. From one-half to one inch of space should be left at the top of the pot as a basin for watering and fertilizing.

Tap the plant out of the pot occasionally for examination of the root system. When the roots have reached the edge of the pot, the plants should be transferred to the next size larger pot. Do not allow the plants to become pot bound until the greater part of their growth period has been reached. The first few flower buds should be pinched off in order that the plant may become sturdy. All female flowers should be removed as soon as they have developed enough to be recognized by the seed pods, visible, just below the petals.

For those that may wish to plant the tuber directly from the starting flat into the pot in which they are to mature, some additional suggestions are offered. An eight, ten or twelve inch pot should be selected depending on the size of the individual tuber. Use plenty of drainage material in the bottom of the pot and then add a couple of inches of potting soil. A tablespoon-full fish meal may then be sprinkled over this. At least two inches (more if practical) of soil should now be added before putting in the tuber. This method has the advantage of only one operation and little need of further fertilization during the growing season. The fish meal is far enough away from the root system of the tuber so that the plant is forced to send out its roots in search of food. This results in a well developed root system that is so essential in producing high quality flowers.

Unless great care and good judgment are used in watering the plants when put directly in large pots, their mortal-



Courtesy Vetterle and Reinelt

*Tuberous Begonia, Double Frilled Type
(Fimbriata plena)*

ity will be high. The soil should be only kept moist until the plants are well established, when they may be watered more freely.

The tubers may also be planted from the flats directly into beds if proper provision has been made for drainage and watering. Most of the standard tuberous varieties of begonias are one sided, so to speak, as the flowers all face in the direction that the leaves point. This should be remembered when placing in a permanent bed so that the flowers may open in the desired direction. While this is also true of hanging basket and multiflora varieties, they have numerous shoots so that the flowers will face in all directions.

The soil mixture for tuberous begonias should approximate one-third leaf mold, one-third *well rotted* cow manure or compost and one-sixth of sand and sod or friable loam. One five-inch pot of bone meal or fish meal to each wheelbarrow of soil. Charcoal bits are also beneficial in maintaining a sweet soil.

Provision should be made for protection of the plants from the direct rays of the sun at all times. This may be accomplished by a lath, cloth or greenhouse, or by planting beneath the shade of large trees and shrubs. As some sun is needed they will not do well in full shade. When the plants have become well established and hot



Courtesy Vetterle and Reinelt

Tuberous Begonia, Double Camellia Type

weather has arrived they will require an abundance of water and may be sprinkled overhead. Keep the humidity high by wetting the area adjacent to the plants.

The plants should be fed so that they will retain their vigor until the end of the season. For dry feeding cotton seed meal or ammonium phosphate used at the rate of one-half teaspoon per eight-

inch pot has proven satisfactory. Larger quantities are injurious, doing more harm than good. This should be sprinkled evenly around the edge of the pot, covered lightly, and the plant watered immediately. Never feed a plant that is dry or not in good growing condition. Two such feedings per season should suffice. Vigoro, Nitro-phoska and other commercial fertilizers, when used

according to directions, may be used if preferred.

With the coming of cool weather in the fall the tubers will begin to mature and the stems and leaves take on a yellowish cast. It is then time to gradually withhold the water. In localities that are subject to early killing frosts the tubers may be taken up with as much soil as will adhere to the roots, bunched close together and allowed to ripen inside. The tops may be cut off to within six to eight inches of the tuber. In either case when the tubers are fully matured the stems will loosen and break away from the tubers. The soil should be kept slightly moist during this period to prevent the tubers from shriveling. When the last of the stems

have fallen off the tubers should be dug up and the dirt washed off the roots. Leave them in a bright airy place for a few days until they are thoroughly dried off and then store in a dry dark place where there is no danger of freezing. Some growers recommend storing them in leaf mold or peat moss which is a good suggestion.

Tuberous begonias may also be started from seeds and the majority of them are raised from seed by the begonia specialist. Many amateurs are growing them successfully but until one has learned from experience, success is rather elusive. For those needing lessons in patience it is highly recommended, but alas! that is another story.

The Use of Simple Outdoor Frames for Rooting of Summer Cuttings

V. T. STOUTEMYER

Complaint is sometimes made of the perversity which makes cuttings of a great number of plants root best in early or mid-summer, when the care of the cuttings is most exacting. Many gardeners are deterred from utilizing this season because they interpret the terse direction of the garden manual "cuttings in June under glass" to signify a greenhouse as requisite to propagation. Actually many cuttings can be rooted as well or better in an ordinary cold frame than in a greenhouse in summer, and with less effort. For many years nurserymen have utilized cold frames extensively in summer propagation by cuttings.

In the cold frame, as in the greenhouse, success in rooting cuttings in summer depends on control of humidity and temperature. Adequate control of temperature at this season means principally avoidance of excessive heat, which is attainable by shading, and maintenance of high humidity, which can be secured with comparatively little watering through use of sash and shades. The general program is to seal the frames almost air tight and to disturb them only for watering; the tighter the seal and the denser the shade practicable, the less frequently is watering required.

This paper describes methods through which ordinary cold frames were used with considerable success at Glenn Dale, Maryland, a few miles from Washington, D. C. Since details of the equipment appear to be an important factor in results, and since certain features of the shading differ from conventional nursery practice, a complete

description is warranted. Long frames, six feet wide, with poured concrete walls were used. These were covered with standard six-foot hot-bed sash. The soil level within the frame was even with that outside. The rooting medium, either washed river sand or a mixture of 75 per cent sand and 25 per cent peat moss, was placed in the frame directly on the surface of the soil to a depth of about four inches. Frames of concrete, tile or brick have a certain advantage for summer propagation since the excellent insulation provides uniform conditions which are difficult to obtain with a board frame unless it is double-walled and filled with an insulating material or banked with soil. These frames sloped to the south, as do most frames used for plant growing. Some, however, have recommended that frames to be used exclusively for propagation should have the slope of the sash toward the north in order to obtain a more indirect light.

The amount of space between the glass of the sash and the rooting medium does not appear to be important. The cuttings root well even when practically touching the glass.

SHADING THE FRAMES

Frequently, propagating frames are set close together with service walks between, so that the whole area may be covered with extensive structures for shading, such as a framework covered with muslin or burlap, or lath shades. This type of shade has the advantage of leaving the glazed sash covering the frame easily and quickly movable at all times. However, when the cuttings, such as these, may be handled without



Fig. 1. General view of propagating frame covered with glazed sashes and single slat shades.

excessive opening or closing of the sash, the simpler and less expensive expedient of laying the shade directly on the sash is fully as satisfactory.

Two types of slat shades were used for shading the outdoor propagating frames, both with and without bottom heat. Shades of this type were three feet by six feet with a board two and three-quarters inches wide on both the longer edges of the shades. Between these were twenty-two slats laid longitudinally with an opening of approximately five-sixteenths between slats. Each slat was approximately one and one-eighth inches wide. When used over standard sash on the frames no additional shade was needed for the propagation of comparatively difficult cuttings and no difficulty was experi-

enced in keeping the cuttings from wilting. A general view of a frame covered with this type of shade is shown in Fig. 1.

Much lighter shades of the same type of construction were also used. These had a piece one and three-quarters inches wide on the outer edges of the shade but had only fifteen slats, each approximately one and seven-sixteenths inches wide. There was an opening of three-fourths of an inch between slats. These shades did not reduce light enough to be safe for most cuttings and therefore were always used in combination with an additional shade made by stretching a loosely woven burlap over a light wooden frame. Both light measurements and observation of the behavior of the cuttings indicated that

this double shade was the equivalent of the single heavier shade. Shading of the sash by painting the glass is not as desirable as a shade raised above the glass which allows a free circulation of air to take place between shade and glass. In windy exposed locations, the shades may be held in place by a wire stretched over the top of the frame or by weights.

AMOUNT OF SHADE

The amount of light is a critical factor in all propagation by means of cuttings. Greenwood cuttings should have as much light as possible without injury, which is usually a vastly reduced amount. A major cause of failure in propagation is often an incorrect amount of light on the propagating bed. Damping-off results from excessive shade; but, on the other hand, the cuttings may be lost by excessive light for even a short period. The shading used on these frames would be considered excessive by some propagators, but the results have justified the use of the amount specified here. The use of light measurements in propagation experiments is to be recommended highly, and probably some system of measuring light will be in common use in practical propagation eventually.

LIGHT INTENSITY WITHIN FRAMES

In order to obtain an estimation of the reduction of light within the frames, readings were made with a Weston Illumination Meter. At Glenn Dale, the normal intensity of summer sun at noon on a clear day is around 10,000 foot candles. The light on the cutting medium at this time under an unshaded sash with clear glass was reduced to about half this intensity. Averages of numerous readings on the cutting medium showed that under the sash with the heavy wooden slat shades, the light

intensity was only slightly over 300 foot candles.

Similar light measurements made in propagating cases in a north lean-to greenhouse at the same time were almost identical. Since excellent results in propagation were being obtained in the greenhouse under these conditions as well as in the frames, it seems safe to assume that these light conditions, if not precisely optimal, were at least adequate.

BOTTOM HEAT

Frames which are used without bottom heat require no excavation. Such frames may be electrified by lead-covered soil heating cables with thermostatic control, which provide ideal rooting temperatures for cuttings of any sort desired. However, the expense of the equipment is a disadvantage and in some localities the cost of the electricity is excessive.

Cornstalks, hay, weeds or other decaying vegetable materials may be used to provide bottom heat for cuttings, but a pit one or two feet deep is required and the heat does not last longer than is necessary for rooting a single lot of cuttings. Our records show that a layer of packed decomposing green rye straw a foot or more thick raised the daily mean temperature of the rooting medium about ten degrees Fahrenheit in midsummer and lasted over a period ample for the rooting of many cuttings with a gradual diminution toward the end of the rooting period.

Advisability of the use of bottom heat depends on two things: the climate of the locality and the time of the summer in which the cuttings are to be rooted. As one progresses northward, the tendency of propagators to use bottom heat in outdoor propagating frames generally increases, particularly in locations in which the nights are cool.

The decision to use bottom heat also depends to some degree upon the period during which the cuttings remain in the frames. The use of bottom heat is often unnecessary for propagation done in the early part of the summer in most of the United States. On the other hand, cuttings placed in frames in late July or August may not root well unless bottom heat is supplied, particularly in many locations north of the Mason and Dixon line. The nature of the plants to be propagated also must be considered in deciding the question of bottom heat. Thus, solar frames or other provisions for high temperatures are used in propagating certain tropical plants even in southern locations.

Some cuttings are benefited by bottom heat even though they form roots without it. Whether the expense and inconvenience of providing bottom heat is justified depends on certain factors which can be decided only on the basis of the experience of the individual propagator. Bottom heat benefits only those deciduous greenwood cuttings which are relatively active and are expected to root and grow on immediately. Cuttings of many sorts of evergreens, such as hollies and yews, are commonly rooted by placing cuttings of well-ripened wood in frames without bottom heat in late summer or fall, and leaving them over the winter with adequate protection. Rooting is completed during the following spring. Bottom heat is usually undesirable for cuttings such as these which are in an inactive condition when first made.

ROOTING MEDIA

Any of the standard rooting media may be used with success in outdoor frames of this type. However, mixtures of peat moss and sand are particularly advantageous for many plants, especially the ericaceous species, and are to be recommended whenever pos-

sible, since they hold water especially well and thus reduce the frequency of opening the frames for watering. Peat mixtures can be overwatered easily. Both the imported and domestic moss peats, somewhat acid in reaction, are satisfactory; but sedge peats should not be used.

On hot, clear days, or when there is considerable wind, great care must be taken to prevent the wilting of the cuttings during handling or when the frames are open. If the cuttings must be inserted during the hottest part of the day, an effort should be made to keep the sash over as much of the opening as possible. A portable shade is sometimes placed over the frame while cuttings are being set. Cuttings should be inserted firmly in the rooting medium, but a heavy watering is quite sufficient to firm the medium about the bases of the cuttings without tamping.

WATERING

The interior of the propagating frames was kept moist at all times. The effective insulation of the frame, however, due to construction, method of shading and also a burlap seal on the edges made only infrequent watering necessary, except in hot dry weather. Long strips of burlap 40 inches wide were folded twice and then laid over the top of the concrete wall, overlapping several inches on both sides. This burlap strip remains saturated with moisture, and provides an effective seal on the edges of the sash, preventing drafts and loss of moisture. Fig. 1 shows a general view of such a frame. The peat and sand rooting medium required much less watering than the pure sand. An occasional sprinkling over the top of the sash and shades of the closed frames was useful in hot weather and helped to keep the burlap moist. The cuttings were watered several times a week if hot weather fol-

TABLE I
Temperatures (Fahrenheit) of Outside Air Temperature and of Rooting
Medium in Frame

Date	Outside Air Temperature in Shade		Air Temperature within the Frame		Soil Temperature	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
July 4	85	64	90	68	74	72
July 5.....	77	70	81	68	73	70
July 6.....	86	62	91	65	72	69
July 7.....	90	69	94	72	72	69
July 8.....	92	73	98	76	73	69
July 9.....	89	71	93	74	73	69
July 10.....	91	68	95	68	74	70
July 11.....	79	58	84	60	76	71
July 12.....	87	55	91	56	77	72
July 13.....	91	63	94	66	75	71
July 14.....	89	69	92	72	75	71
July 15.....	85	54	84	57	77	72
July 16.....	80	60	83	52	75	69
Average....	86	64	90	66	74	70

lowed insertion. After several weeks the frames having a peat and sand medium could be left for five to ten days without attention. In fall and winter practically no watering was needed, although routine inspections were continued at intervals of several weeks.

VENTILATION

No ventilation was given at any time during the period of rooting. After the cuttings were well rooted, a period varying in length depending on the nature of the plant, air was admitted to the frame in increasing amounts to harden off the cuttings. This was necessary only if the cuttings were to be carried over the winter in these frames, instead of being potted at this stage.

CONDITIONS WITHIN THE FRAME

The humidity of the atmosphere within the frames was high, causing frequent condensation of moisture on the glass, but because of the slope of the sash, the water ran downward to the edge of the frame.

Records with soil and air thermographs showed that the temperature of the air fluctuated considerably between day and night and also with changes in the weather conditions, but the temperature of the rooting medium remained relatively constant. The maximum and minimum temperatures of a frame covered with the single wooden slat shades as described previously are shown in Table I. These temperatures were recorded in early July and show that the rooting medium was maintained near 70° Fahrenheit, which is a satisfactory temperature for the rooting of cuttings of the majority of hardy plants.

RESULTS OBTAINED

Among the cuttings of woody species which have been rooted in these frames without bottom heat are:

Buxus sempervirens L., *Celastrus orbiculata* Thunb., *Cotoneaster* sp., *Dipelta floribunda* Maxim., *Disanthus cecidifolius* Maxim., *Ilex* sp., *Loropetalum chinense* Oliv., *Pyracantha coc-*

cinea Roem., *Rhododendron* sp., *Stranvaesia Davidiana* Dcne.

The few cuttings which have not rooted well were those having a densely pubescent foliage. Such plants are sensitive to excess moisture and should be handled in the greenhouse. Often, however, the frame has been superior in comparison with a greenhouse propagating bench. For instance, cuttings of *Dipelta floribunda*, which have never rooted well in the greenhouse in summer, were rooted with virtually no losses in these outdoor frames. Superior results were produced with much

less attention than would be required for similar cuttings in the greenhouse.

ACKNOWLEDGMENTS

These observations on the environmental conditions provided by the frames used in this study were made during experiments on the propagation of difficult plants conducted jointly by the Division of Plant Exploration and Introduction, Bureau of Plant Industry, and the Hillculture Division, Soil Conservation Service. Mr. F. L. O'Rourke and Mr. J. L. Jester assisted in some of the details of propagation.

Glenndale, Md.

A Few More Oriental Crabapples

DONALD WYMAN

SOME OF the most outstanding of the crabapples have been mentioned in the three previous issues of the NATIONAL HORTICULTURAL MAGAZINE, but there are still at least seventeen other species growing in the Arnold Arboretum, most of which can be classified in this "oriental" group. Of these, some are more valued ornamentally than others; and, even though some of these are, fortunately, now common in the nursery trade, they might well be mentioned on these pages for the sake of emphasis.

Malus brevipes is probably closely related to *M. floribunda*, though the exact origin of this species is unknown. It has been in cultivation since 1883, and can be considered as one of the first—if not the first—of the crabapples to have colorful fruit in the late summer. Plants at the Arnold Arboretum face the ground well on all sides, making a dense mound of closely leaved branches. The fruits are about one-half inch in cross section and begin to color a beautiful deep red during the latter part of August while the green leaves are still in perfect condition, making an excellent display of color. The flowers are nearly pure white. This low, mound-like tree makes a splendid specimen, particularly for facing roads and walks where late summer and early fall interest is needed.

The tea crab, *M. hupehensis* (listed in nursery catalogues as *M. thersifera*), was discovered by Wilson in China and brought to this country in 1900. Since that time it has proved its value in American gardens as a very decorative small tree. It has long, upright spreading branches, thickly studded with

short spurs which bear numerous clusters of flowers. These flowers are deep pink in bud; and when the weather is cool, the flower buds remain closed for some time. As the flowers open, they become almost white. It is easily one of the most striking of the crabapples, particularly on account of its fan-shaped form. Wilson has often told how certain of the natives in central China prepared a red tea from this plant. The variety *rosca* has buds and flowers of a deeper pink color. The tea crab is at its best in flower. It is the most picturesque of the crabapples and its irregularly spreading fan-shaped habit makes a winter display of considerable ornamental value. The fruits, however, are a poor greenish yellow with a red cheek, and not particularly ornamental. This is one of the few crabapples which when raised from seed will be practically identical with the parent plant in every way.

The Sargent crab, *M. sargentii*, is, fortunately, fast becoming a common resident in our gardens for it is the lowest growing of all the crabs, seldom growing over 6-8 feet tall. It was discovered by Professor Sargent, the first director of the Arnold Arboretum, in northern Japan in 1892. Typically, it is a shrub, mound-like in appearance with its lower branches lying on the ground. It is easily distinguished by its low habit and its three-lobed leaves. The flowers are pure white, but in the Arboretum there has appeared one plant with the flower buds a good pink. The fruits are smaller than those of most of the other crabapples and are a wine-red color. Although they are not particularly conspicuous, they do color



Arnold Arboretum

Malus Zumi calocarpa



Arnold Arboretum

Malus Sargentii

before the leaves drop off in the early fall. In this country it has been clearly demonstrated that when the plants are grown from seed collected in the United States (and this is where many nurserymen have received their first stock plants), many of the trees are considerably taller and do not have the desirable, low dwarf habit had by this species in Japan. In order to obtain this desirable habit, it is much better to propagate asexually from trees having the desirable qualities or to obtain seed direct from Japan. *Malus sargentii* is suited very well for the small garden where space is the limiting factor, and its small fruits are especially sought by the birds.

The cutleaf crab, *Malus toringoides*, need not be used for its flowers alone for they are small and white, appearing after those of most of the other single flowering crabapples have faded. Moreover, they are not particularly ornamental. The real value of this plant lies in its fruits. These are beautifully colored, red on the side towards the sun and yellow on the side away from the sun. They are not round but slightly pear shaped, and remain on the tree for several weeks after the leaves have fallen. This is one of the few crabapples in our collections which is known to breed absolutely true from seed. *Malus toringoides* and the somewhat similar *M. transitoria* are the last of the Asiatic crabapples to bloom. It is not a tree to be selected as the single representative of its class in a garden, but where other individuals are planted for their flowers and fruits and space is available, this tree might well be an added attraction in the fall, when it is at its best.

The pearleaf crabapple, *M. prunifolia*, is not common in nurseries. It is one of the hardiest of the oriental crabapples, being a native of northeast-

ern Asia. The flowers are pure white. The fruits are about the largest of those of all the Asiatic group, being approximately $\frac{3}{4}$ of an inch in diameter. Its variety *rinki* is called the Chinese apple, for it is this tree which was cultivated in China and later in Japan where it was the only apple cultivated as a fruit tree until the advent of the American apples. The flowers of this variety are pinkish. The fruits of both species and variety are yellow to red, quite conspicuous, and they last a long time after the leaves have fallen from the tree. Ornamentally then, these trees are valued chiefly for their fruits. Normally, they are somewhat upright in habit of growth but there is a fastigate variety growing in the Arboretum (*M. prunifolia fastigiata*) which is everything the name implies. As far as I know, this form is not available from any American nursery, but another upright crabapple, *M. robusta fastigiata*, is listed in at least two 1941 nursery catalogues.

Malus sieboldi was introduced into the gardens of Europe by von Siebold from Japan in 1853. It is a low dense tree of spreading habit, with small three-lobed leaves on vigorous shoots, and with small flower buds, tinged rose and fading white as they open. Actually, this is a small form of the larger tree, *M. sieboldi arborescens*, which may grow thirty feet tall and which has minute fruit, yellow on some trees and red on others. Although the flowers are small on both trees, they are produced in immense quantities. They bloom only slightly before *M. toringoides* but after most of the other Asiatic crabapples have finished. Like *M. brevipes*, *M. Sieboldi* makes a low, dense mass of foliage, has profuse flowers and fruits, and can be well used at the edge of a walk, drive, or border for this reason.

The last species to be mentioned here is another ornamental of great promise, not yet available from more than a very few American nurseries. It is the Zumi crab, *M. zumi*. It is a densely branched small tree. Borne in profuse quantities, the flower buds are pink and the flowers gradually fade white. The dark red fruit may be as much as $\frac{1}{2}$ inch in diameter. Fruits of the variety *calo-*

carpa may remain all winter long, which is quite an asset. Apparently, for some unknown reason, the birds do not feed on the fruits of certain specimens except as a last resort, thus allowing the trees to maintain their human interest for a longer period than they might otherwise.

Arnold Arboretum.

The Leucojums Spring and Summer Snowflakes

FRANCES EDGE McILVAINE

As the Autumn days wax and wane, the most comforting thought a gardener has, is of those bulbs that have been tucked away in the soil this year or last year or many a year ago.

Of all the species that gladden the spring, those that bloom earliest are the most precious, the snowdrops and the snowflakes.

Galanthus and *Leucojum* are their respective botanical names.

It is reprehensible, yet there are still many of those who call themselves gardeners, who say of the snowflake, "What a large snowdrop!" showing the casualness of the superficial. And I can say this with understanding, for I remember the time when I thought unintelligently and very casually that *Jasminum nudiflorum* was too much like forsythia to bother with and did not add it to my plantings for some years. In that dim distant time I had not handled, dug and planted my own roots and bulbs with the diligence that I learned later. There was a careful old German gardener then and I was not always there at planting time. Nor did I realize then what joy the handling of roots and bulbs would yield me, so that now after years of doing it, roots and bulbs have become my very Lares and Penates.

These genera are very unlike; indeed alike only in their earliness and in the bell-shape of their white and green spotted flowers.

Galanthus: gala, milk; anthos, flower.

Leucojum: leukos, white, ion, a violet referring to the color and fragrance of the flowers. Both *Galanthus* and *Leucojum* belong to the Natural Order, Amaryllidaceae. The *Leucojum* is the subject of this small monograph.

John Weathers lists nine kinds in his Bulb Book, but there are only three in general cultivation, *L. aestivum*, *pulchellum* and *vernum*. The nine are as follows, for some day after the present upheaval in Europe is over we may once more go bulb-hunting and all the autumn varieties to the three kinds we can still purchase.

L. aestivum, known as the summer snowflake, widely distributed over central and southern Europe to the Crimea.

L. autumnals, this is found wild from Portugal and Morocco to the Ionian Islands.

L. hyemale, native to southern France.

L. longifolium, this grows wild at an altitude of 4,500 to 6,000 feet in the Corsican mountains.

L. pulchellum, a native of Sardinia and the Balearic Isles, closely related to *L. aestivum*.

L. roseum, a small bulbous Corsican plant, leaves after the flowers rosy-red blossom!

L. trichophyllum, from southern Europe and West Africa.

L. vernum, the best of the genus native of central and southern Europe and naturalized in parts of Dorset, England.

This list makes only eight kinds but as he adds under *vernum* the var. *biflorum* or *Vagneri* and the var. *carpaticum*, one may call it ten.

Of the three species to be had in commerce, I will take first, *L. vernum*; it is my favorite and I have had long experience with it. Each Spring I wish I had transplanted and divided more of them. The broad leaves, of a bright deep green, show very early in the new year, often indeed they put their tips through the ground in December. They should be planted on the eastern side of the wall or house as the cold north and west winds shorten their stems and give them a stumpy ungraceful appearance.

They have a fault which should preclude their being planted where other and later bulbs are massed, namely that after their flowering season is over, they keep sending up such stout and luxuriant foliage that they take up far too much space in the beds or ground near the house windows where one wants other various "early comers" as Mr. E. A. Bowles calls the first flowers of the new year.

Their other fault is that their flowers, though more showy than those of the snowdrop, are not so lasting when brought into the house. They are fragrant and charming, but a day, or sometimes a few hours, in the warm atmosphere drains the life from their glistening petals and a thin transparency

results that is far from attractive, while their little step-sisters, the snowdrops seem to gleam whiter and whiter when brought indoors.

Here in Chester County, Pennsylvania, though the snowdrops may come first, they and the snowflakes bloom together for a long period. Most of mine which came from that good old Dutch firm of Krelage many years ago are the var. *Vagneri* with two flowers on a stem. The bulbs increase fairly rapidly and if one has left a clump in a place crowded by other roots, one finds just as with narcissi, many malformed long narrow growths, made in their anxious endeavors to reach the light.

L. aestivum has been with me longer than *L. vernum*, as large clumps of them were here in my grandmother's garden, and bloomed in May when the first peonies, *Festiva Maxima* bloomed on the central garden path. They have the same trick of showing their tips early in the winter. My clumps were so very hard to lift, being crammed in by the peonies, that I gave up in despair digging those and in my opulent garden days and the days of prompt shipment from Europe, we bought what we thought were the same; they were *Leucojum* all correctly, but were *L. vernum* and thus came that first early Spring surprise of bloom with the snowdrops. Later I tried again and received *L. pulchellum*, which as was noted above is closely related to *L. aestivum* but and alas! "differs chiefly in having narrower leaves and smaller flowers, and flowers somewhat later in the season." Much smaller and very insignificant flowers and hanging at the very end of very tall narrow leaf-like stems they are disappointing. However—a bit of information has just come to me in an unexpected manner and suggests a treatment that may improve them.

Idly picking up a book at the library some weeks ago, I decided to take it home, though with Autumn work still hanging over, I had no business adding a gardening book to my reading.*

They are often too stimulating and one rises with too many ideas and plans when the necessary tasks are still undone. This book was English and very sad with the atmosphere of the war to come and retrospect of journeys taken, and plants procured from the wild. Suddenly I came on something new. "Lodden lilies," he said, "grow about twelve miles from here on the river which gives them their name. Their Latin name is *Leucojum aestivum* and they are sometimes called Summer Snowflakes. I have rarely seen cultivated plants so splendid as the wild ones which were growing, many of them, in a foot or more of water. That, I think, is their secret. They are to be found wild on drier parts of the river bank, but the tallest and sturdiest and most floriferous are growing with their bulbs entirely under water. The Lodden lily is quite cheap in commerce, and we have a number of good clumps, all of which are planted where the bulbs are usually submerged."

This may be their secret but I should not like to try it through a Pennsylvania winter. Think of our freezes and our thaws, but a damp spot could be found. I tried this though for the *Narcissus alba plena odorata* and "niver a bloom" do I get; they all blast as usual, just as their long sheathe is ready to burst. Once in a blue moon, I do get one perfect gardenia-like flower. I shall try the experiment with a few of my newly christened Lodden lilies, namely that clump of disappointingly small flowered *Leucojum* by the gate.

There are great quantities of leucojums blooming in March around Charleston and Summerville, South Carolina; these must be *L. aestivum* also, as their climate is some two months ahead of ours in Pennsylvania.

It is strange, it is sad, that we do not progress very fast in our use of garden material. Here is a note from a garden in 1787, from F. W. Curtis at his Botanic Garden, Lambeth Marsh, England, and another note from Grey's "Hardy Bulbs," published in 1939, a long space of time during which the leucojums, Lodden lilies or snowflakes under whichever name one knows them, have not yet joined the list of bulbs of which one thinks when planning a garden.

F. W. Curtis, in Curtis' Botanical Magazine in the year 1787, says, "The blossoms of the *Leucojum* and *Galanthus* or Snow-Drop are very similar at first sight, but differ very essentially when examined; the Snow-Drop having, according to the Linnean description, a three-leaved nectary, which is wanting in *Leucojum*; the two genera then being very distinct, it becomes necessary to give them different names, we have accordingly bestowed on the *Leucojum*, the name Snow-Flake, which, while it denotes its affinity to the Snow-Drop, is not inapplicable to the meaning of *Leucojum*."

As the Spring Snow-Flake does not increase so fast by its roots as the Snow-Drop or even the summer Snow-Flake, so it becomes much scarcer in the garden, it may indeed be almost considered as one of our *plantae rariores*, though at the same time, it is a very desirable one.

It does not flower so soon by almost a month, as the Snow-Drop; but its blossoms, which are usually one on each foot-stalk, sometimes two, are much larger and delightfully fragrant. It is found wild in shady places and

*Three Acres and A Mill, by Robert Gathorne-Hardy.

moist woods in many parts of Germany and Italy. The most proper situation for it is a north or east border, soil a mixture of loam and bog earth; but by having it in various aspects this, as well as other plants may have its flowering season forwarded or protracted, and consequently the pleasure of seeing them in blossom, considerably lengthened. In a favorable soil and situation, it propagates fairly fast by offsets.

We will now follow this somewhat long-drawn out eighteenth century discourse by that of Grev of modern times, in 1939, in his "Hardy Bulbs." *Leucojum vernum*. Linneaus. Widely distributed throughout Central Europe and the best known member of the genus as far as gardens are concerned. The bulb is round, about an inch in diameter with a pale green tunic; the leaves, ligulate, dark green, six to nine inches long; the stem, ancipitous, hollow, six to twelve inches in length, the spathe simple lanceolate, green, the

flower usually solitary, globose, sweetly scented, on a short drooping pedicel; the segments ovate, acute, white, green-tipped, with yellow anthers longer than the pale green filaments, the style short, filiform with small clavate stigma. It flowers throughout March and early April, and is a delightful garden plant, naturalized here and there in the south of England. It appears to me to be at its best in a limey soil. Var. *Carpathicum* (Herbert) Bake., a native of the Carpathians, with yellow tips on the segments.

Var. *Vagneri* Stpf., a robust form with two or more flowers.

In 1818 there appeared a plate in Curtis' Botanical Magazine that would suit this description and moreover under it reads the caption "communicated in March last by Messrs. Whitley, Brame and Milne, who received bulbs of this plant with several other rarities from a friend who collected them in the Carpathian mountains."

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Rhododendron hybridum Ker [See page 139]

In Rehder and Wilson's "Azaleas" there is a considerable discussion of those plants reported as hybrids between (evergreen) rhododendrons and (deciduous) azaleas which is based apparently upon the records in the older books and reports from garden papers of the time. With commendable skill the literature has been combed, various plants reduced to synonyms and diverse individuals of common ancestry gathered under one head.

For the excellent plant illustrated on

page 139, we have to use the most unfortunate name, *Rhododendron hybridum* Ker, if we follow botanical history, unfortunate since *hybridum* is a name that gives no definite individualization.

To quote Ker this hybrid was "raised by Mr. Herbert of Spofforth near Weatherby, from seed ripened on the common white glaucous-leaved Azalea in the flower of which pollen or dust from the anthers of *Rhododendron maximum* had been purposely substituted for that of its own flower."

The illustration that accompanies the Ker note [Bot. Reg. III t.195 (1817)]



R. L. Taylor

× *Rhododendron hybridum*

[See page 138]

is not nearly so good a counterpart to our illustrated plant as the figure that appeared in *Curtis Botanical Magazine* t. 3454 (1835) in which it is reported that "This charming plant has been for some time cultivated in the American border of the Glasgow Botanic Garden under the name by which it was received of *Rhododendron fragrans*. It has every appearance of a hybrid, and has so many points common with the *R. hybridum* (bigener, of the Botanical Register) that I have little hesitation in referring to that figure as a synonym. The chief differences are, that in the plant alluded to, the flowers are smaller, and the leaves larger than in ours, which latter is indeed the much handsomer of the two. *** Whatever be its origin, it is amply worthy of a place in every flower garden and shrubbery." (W. J. Hooker.)

The plant from which the photograph was made was purchased from the Sunningdale Nursery (England) under the name "*R. azaleodendron odoratum* (fragrans)" but it does not belong in the series for which Rehder has now reserved the name $\times R. azalcoides$, namely hybrids from *nudiflorum* \times *ponticum* nor those he calls $\times R. azaleodendron$, namely hybrids from *R. japonicum* \times *eurohododendron* hybrids.

One is tempted to retreat behind the last sentence quoted from Hooker!

As a garden plant it is valuable because its flowering coincides with that of *R. indicum* (the *Azalea macrantha* of the trade) and after most azaleas and rhododendrons have gone by, including most clones of *R. viscosum* but not *R. maximum* its other supposed parent. It is delightfully scented with a widely pervasive fragrance but the flowerheads are more or less hidden in the masses of new shoots. In our plant which is entirely deciduous, the buds are tinted deep lilac pink, paler on the edges of the open flower but there is practically no yellow in the area where the blotch should show. This, however, is a factor that varies greatly and should not be given too much importance.

Whether it has much merit to recommend it above its reputed seed parent *R. viscosum*, one cannot say with too much finality, since that is a beautiful and fragrant species and includes among its variations many tinted examples. Among the plants known to me, however, is none that has such broad lobes and therefore such effective flowers. Flowering here in mid to late June, when the air is already sweet with honeysuckle, swamp magnolia, wild grape, regal lilies and many other things, its spicy pungent scent only builds up the wealth of perfume that belongs to June.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Rock Gardening in California

Several years ago the distinguished President of the American Rock Garden Society paid the Pacific Coast an official visit. He entered our state by way of Southern California and, as he

passed over the Oregon border, on his way to the Pacific Northwest, he is reported to have remarked that "rock gardening in California was like osculation in Scotland—just in its infancy." After twenty-five years of intensive,

not to say heart breaking experiment. I am inclined to think our friend "had something." Of course, rock gardening is a big subject and so is California, and, as my experience is confined solely to the San Francisco Bay region, it may be that someone in the northern part of the state could tell a different story. Certainly, if we are concerned with alpine plants rather than succulents, the southern part of the state could hardly qualify as a rock gardener's paradise. The principal reason for this, like everything else in California, is the "climate." It is decidedly not alpine—not in the principal cities, or their suburbs, where you would expect the rock gardeners to be. An English nurseryman friend of mine sent me some rare seed and admonished me to "be sure and give it a good freezing." In a refrigerator, yes, but not otherwise. We seldom, if ever, get a really killing frost in the bay district, let alone freezing weather.

Possibly the horrible examples which pass as rock gardens act as deterrents to the would be alpinists. Farrar, the High Priest of the English rock gardens, so aptly describes them as the "Almond Pudding," the "Dog's Grave," and the "Dragon's Teeth." In all fairness, I do not believe these fearful and wonderful creations are limited to California. At any rate, they do not help the cause of rock gardening. Another cause for lagging interest is the lack of success with our own High Sierra alpinists. They as a class, have proved anything but tractable in our gardens. British authorities refer to *Primula suffrutescens* as easy, but I have seen mighty few cultivated plants of this beautiful species, and fewer flowers, even when raised from seed.

I have tried many experiments, including the attempt to grow alpinists in sphagnum moss, as outlined and recom-

mended by the late H. Correvon of Geneva, Switzerland. The results, however, if compared with the beautiful pictures of the magnificently flowered plants in the English magazines are hardly satisfactory. Not that many, or nearly all the plants, do not grow. Here, in San Francisco at least, they do grow very well. I have many large specimens of saxifrages, European primulas, and rare campanulas, but they seldom bloom. Beautiful plants of *Soldanella alpina* have never had a flower. I saw many of our native penstemons in the Edinburgh Botanical Garden, of all places, blooming like the proverbial Bay tree. They just about exist here.

But there is a bright side to the picture, and patient effort always brings its reward. Most of the plants of the Mediterranean region do well here and, if we practice a little selection, there is plenty of material to choose from. South African bulbs find a congenial home in California. The Asiatic primulas of the bog type can be grown if planted in shade and where they can get abundant moisture.

Dwarf shrubs such as heathers, brooms, and some of the dwarf rhododendrons and many other members of the Ericaceae do very well. One can have a good collection of dwarf conifers, if you can obtain them. Australian and New Zealand plants do particularly well in the Bay District, especially the veronicas. A sheet of *Veronica rupes-tris* in full flower is not to be despised.

William Robinson, the great English gardener, referred to the androsaces as the most alpine of alpine plants. Strangely enough, they do very well here, and I have good flowering plants of the *Sarmentosa* group and several others.

The alpine dianthus are a success and *D. alpinus* and *D. neglectus* bloom freely in full sun and gritty soil, and this is

true of almost all the smaller species that I have tried.

The gentians, as a whole, are not easy. *G. acaulis* flowers for some of my friends, but not for me. I once had a plant of *G. verna* with four lovely flowers, but the plant did not last long. Sad to tell, the newer Asiatic gentians, which do so well in Portland, Seattle and Victoria, B. C., have not done so for me, although I have tried my best to suit them.

Most of the little iris species find San Francisco to their liking and *Ramondia pyrenaica* deigns to give us a few flowers. The commoner rock plants, the ones we rely on for color masses, can be depended upon. I have had veritable sheets of bloom on the mossy saxifrages—although the large plants or groups of plants covering more than a square yard, which we saw at Edinburgh, make me very modest. A list of successes include *Omphalodes luciliac*, *Ourisia coccinea*, *Campanula garganica* and *C. saxifraga*, *Meconopsis Baileyi* and *M. integrifolia*, *Primula nutans*, *P. litionania*, *P. pulverulenta* Bartley strain, *Iris chrysographes*, *Asperula suberosa*, and many of the alpine phloxes.

These successes or partial successes only serve to spur one on, and I expect to die in the attempt to accommodate these "little children of the Hills."

Finally, let me say that a friend of mine had a good clump of *Saxifraga cotyledon*. There it stayed in his San Francisco garden for many years, and, to the best of my knowledge, just bloomed once in ten years. He also owns a place on Lake Tahoe, on the Nevada side. The elevation is about 6,700 feet. He took the saxifrage up to his Lake Tahoe garden and there it flourishes and blooms every year, with no particular care. The question is whether we can, at sea level, overcome

the disadvantages of climatic and altitudinal conditions.

ROBERT E. SAXE

San Francisco, Calif.

Native Gingers

For that difficult spot in the shade where the soil is poor and dry, where nothing will thrive we might try some of the asarums. If one will keep them watered until established there will be no further trouble.

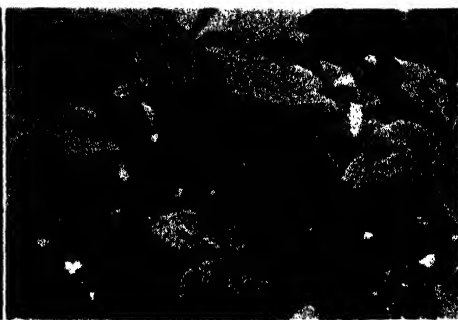
These "heart leaves," "wild gingers," etc., of our childhood days are either one well advised as the foliage is shaped very much like a heart and the odor when crushed is that of ginger. These plants have fleshy roots which withstand drouth when established, and thick glossy leaves. There are several species of these plants, all about equally attractive. They all have small brown "jugs" for flowers carried at the ground level just at the junction of the leaves and one usually has to move the foliage aside to enjoy the blooms.

Asarum virginicum is perhaps the best known. It grows in this state from the mountains to the coast. The foliage is usually beautifully marbled with white lines. The small flowers have wide open "mouths" of rich purple with many spots on them.

A. heterophylla has the same handsome foliage but the jugs are nearly closed and not as attractive as any of the others. The "big-bloom" ginger is *A. Shuttleworthi*. The flowers are more than an inch across and flare widely at the tips.

A. arifolia is always attractive with the large arrow-head like leaves. This grown to perfection in the eastern part of the state although it's found in the foothills also.

The deciduous one that is common through here is *A. canadense*. The

*Vaccinium crassifolium**Arisaema pusilla*

leaves have a lovely sheen seldom seen in plants and the blooms are of deep chocolate color. It's like burnished steel and glistens in the light. It likes rocky shady places but grows well in ordinary woodland soil. As it spreads by underground runners a large colony is soon established. The flowers are rich chocolate and pointed at the tips.

A bed or just a few plants of any of these gingers will be a great help to any garden in shade.

ANNIE LEE R. CLEMENT

Asheville, N. C.

Vaccinium crassifolium

The need of a ground cover is often felt and to get one that is satisfactory in every way is very difficult. One wants a plant that is low; which will grow rapidly, yet not crowd out all other plants it comes in contact with; look neat at all times, even in winter, which means it must be an evergreen; grow in sun or shade; and grow in any kind of soil, whether rich or poor.

I believe there is one plant which will fill the order. *Vaccinium crassifolium*, creeping huckleberry is the nearest to these requirements of anything I have

ever seen. This little creeping plant grows in the pine barrens and is used to hardships. Often the plants are burned over each year, yet as soon as the smoke clears away they are back again and soon add their considerable beauty to the landscape. The foliage is very like that of boxwood, deep glossy and thick. In sun it is a rich bronzy color and in shade it is a rich green. It grows to a length of about 4 feet but as it takes root as it goes along one can hardly tell just what a plant really is. The plants withstand drouth to a remarkable degree. The bell-shaped flowers are small but attractive, popping out from the axils of the leaves. In fall the fruits are dark blue in color and have the delightful flavor of true huckleberries.

Growing among them in nature one usually finds *Arenaria caroliniana*, *Pyxidanthra barbulata*, *Asarum virginica*, *Hypericum asphalathoides*, *Ilex glabra*, *Magnolia glauca*, *Cyrilla racemiflora*, *Kalmia cuneata*, many more of the semi-bog plants, all of which do well when transplanted to drier situations. I assume that they would require an acid soil as they are growing in very acid sandy loam and are so closely related in the Ericaceae. This, however,

can be easily managed by the addition of aluminum sulphate once or twice a year. I feel that the answer to "what shall I use for a ground cover" is answered here. When this plant is better known it will be much in demand.

ANNIE LEE R. CLEMENT

Asheville, N. C.

Arisaema pusilla

We all like the name "Jack-in-the-Pulpit" and are familiar with the Indian Turnip but how many of us really appreciate this handsome woodland plant and grow it in our shady gardens?

Arisaema pusilla is the smallest of the group and is usually about six inches tall. *A. triphyllum* is the common one and it is usually about two

feet tall. In both of these the spathe, or canopy of the pulpit, may be purple and green striped or it may be two shades of green. The spadix, the preacher, or Jack, is always dark brown or purplish. The foliage is large and strong and is tropical in appearance. The five leaved plant, *A. quinatum*, is fully as handsome as the preceeding. The flowering part is alway two shades of green, so far as I have observed and been able to find out. All produce handsome bright red fruits in fall and is very colorful among the greens and browns at that season of the year.

The roots are large corms, something like a turnip. If eaten or rather tried to eat it will burn worse than pepper.

ANNIE LEE R. CLEMENT

Asheville, N. C.

Cacti and Other Succulents

Leuchtenbergia principis Hook. .

Plants of this Mexican cactus exhibit one of the most astonishing among the many curious forms that this diverse family presents. We know it only from a small seedling, newly acquired and from rather old plants in a local collection. The latter have suffered many vicissitudes particularly from over watering and insufficient light, with the result that their "thick fleshy stem" looks far from fleshy but rather woody, dark and scarred, with a somewhat uneven crest of the long triangular tubercles across its crown. This, I am told, is their usual unkempt appearance in adult life, especially late adult life!

The small plant is quite another matter with only a few, not over fourteen, tubercles which are so long and stand

so freely apart that they look rather like great gray green "jacks" such as children use in play.

The areoles are "rather large, with grayish wool, at the tip of the tubercles, bearing angular papery spines." In a small plant these make a curious effect at the ends of the tubercles.

According to the literature, flowers are borne at the tips of the new tubercles which surely must give an even more astonishing effect. The only record found so far to suggest how old a plant must be before flowering may be expected, is "four to five years from seed."

All the directions for cultivation suggest a deep pot to accommodate the long, tapering root; a porous soil mixture with lime, and a situation that will be both warm and sunny.

According to the text in Britten and Rose (*The Cactaceae*, Vol. 3, pp. 108-109), although originally reported from Hidalgo it is also known from the states of San Luis Potosi, Guanajuato, Zacatecas and Coahuila—and that “Dr. C. A. Purpus writes that he found this plant in slate and lime formation in the Sierra de la Parras near Parras, Coahuila, and still more abundant in the Sierra de la Paila, also in Coahuila. This last station is a very inaccessible desert mountain range, almost without water; vegetation is very scanty. This species is associated with other cacti and with *Agave lophantha* which it resembles in habit more than it does that of its own relatives.”

With such a native background as this the amateur who grows it in pots should think twice before pouring water on the specimen on the window ledge.

Mammallaria camptotricha Dams.

Among the species of mammallaria that have grown well on the window

shell is this plant, cited in Britten and Rose as coming from the “deserts of eastern Querétaro, (pronounced kě-rět'-ar-o), Mexico.” Possibly the word desert gives the clew to its present success! As it is still a young plant as cactus go, this may be ephemeral if measured in time. It is as yet scarcely more than an inch and a half tall but has already begun to show small offsets that make a clustered mass of pale green tubercles, rather longish as these go, each tipped with a whitish tuft of radial spines with several whitish central spines that are long enough to make a mass of almost lace like character over the plant mass contrasting finely with the tender green. Whether the appearance will be as good when the plant is older and taller and the oldest tubercles have withered and browned remains to be seen.

As yet there has been no sign of flowering but the illustrations show rather smallish flowers set almost within the mass. These are described as greenish without and white within.

A Book or Two

Plants and Chemicals. W. E. Bott, Lakewood, Ohio. 25 cents. 1941.

This is the fourth in a series of four annual reports of experiments by an amateur plant grower. Nothing new will be found here by those familiar with recent botanical and horticultural literature. However, some of the experiments in the inducing of plant mutations with the aid of colchicine were successful enough to interest a leading seed firm.

The booklet concludes with a plea for more plant experimentation by amateurs, which is probably a worthy ob-

jective. Certainly the achievements of some amateurs in the fields of plant breeding, systematic botany and the like have been impressive. Occasionally the amateur makes an outstanding discovery. Mendel, for instance, laid the foundation for the whole modern science of genetics using little more than a small garden plot, a notebook and a few packets of pea seeds. Personally, we are convinced that much profitable experimentation with plants may still be done using quite simple and inexpensive equipment.

V. S.

Green Enchantment. Rosetta E. Clarkson. The Macmillan Company, New York, 1940. 328 pages illustrated. \$3.00.

Before reading any book it is well to examine the preface, if there be one, especially if written by the author. Mrs. Clarkson has a brief preface which begins:

"My thought in *Green Enchantment* is to recapture a little of the mystery and lure of gardens, a little of the background that makes the thought of gardens one of peace and happiness to all of us, year in, year out. Always men have been fascinated by green growing things, have built tales and legends all about their plants and have invented plants of even stranger nature than the ones they knew."

To accomplish this, there have been assembled as a book a great number of

separate chapters chiefly unified by their background of time and interest. Most of them could stand alone. They deal with various ancient matters. One either likes such things or has no use for them at all. The reviewer does like them but does not know enough to say if Mrs. Clarkson has chosen "only the best." One can skip over "In a Monastery Garden" or "Herbs of Beauty" or "Early Gardening Tools" if he will and read "A Prelude to Salads" or "The Tooth of Saturn" or divert himself with "Herbs That Never Were."

If you are the sort of gardener who is concerned only with the largest marigolds or such, you won't care much for this book. If you are stylishly engaged with herb growing, you must read it. If you are just a comfortable and properly curious gardener, you will want to read it.

The Gardener's Pocketbook

Some Violets

If only violets were not such rampageous spreaders, and didn't root so tenaciously in the middle of mats of small campanulas or pinks, or in various other places where they couldn't be allowed to stay! Yet in spite of their wild ways, we must have some of them in any garden that is not too formal. They seem to occupy much the same place with us that primroses do in England. There is no flower that children like better to pick; and we had an aunt who every spring rode on the horse-cars ten miles out from Boston, just to pick violets. She liked especially the long-stemmed meadow violets that companioned the cowslips and small white violets in "Jack Hagar's meadow."

To me, the Birdfoot Violet, *Viola pedata*, is the most beautiful of all that I know;—and I mean *pedata*, not its variety *bicolor*, striking as is the rich velvety purple of *bicolor*'s two upper petals. *Pedata*'s pale blue-violet color varies considerably, and sometimes we have found a white one. Unlike most violets, the fine-cut leaves make no great mass of foliage, but the more than inch-wide flowers, the largest of the violets, I believe, carpet the ground in places that they favor. They used to like the scrub-oak woods that cover so many acres about Concord and Lexington, in Massachusetts. They like sunny places in sandy soil, with some acid leaf-mould, and satisfied in these respects, will endure almost any amount of dryness.

Another cut-leaved violet, though not a native, is the Japanese *V. eizanensis alba*. The leaves of *pedata* are usually finer cut than those of the Japanese species, the almost linear segments (commonly seven in number) being cut close to the petiole, though in some plants all the divisions are not so deeply cut. These leaves reach a width of about two-and-one-half inches, and a height of six inches or so. Those of *eizanensis alba* are somewhat larger, and are cut as deeply as possible into usually five parts, each of these parts being cut into three parts about a third of the way down, and these still further shallowly toothed. There is more substance to these leaves than to those of *pedata*, and they are held more nearly horizontal.

I planted seeds of *V. eizanensis alba* in February two years ago, and set the little plants out in a sunny place by the rock edge of a garden bed. After a time they began to produce cleistogamous flowers, and in the fall a few very round and shapely flowers nearly an inch across, though as the petals reflexed somewhat at about half their length, they seemed hardly so large. They were pure white, except for a few very short purple lines in the throat. The old plants did not survive the winter, but seedlings appeared in the spring to follow the same procedure, as they are doing again this year. As the plant grows steadily through the season, the contrast of the rich deep green of the older leaves with the successively paler greens of the younger ones, is very attractive. The plants are six or eight inches across, and about six inches tall. I hope to be able to keep at least a few plants over winter, so that I may see them in full spring bloom, but I would grow a few of the plants for the foliage effect alone.

We greatly like another white violet

which we have not been able to name. It is certainly not a native, of this part of the country, at least. It is literally smothered for several weeks in the spring with inch wide, rounding white flowers, almost destitute of throat markings, and the fresh green foliage is attractive for a long time afterward, if the season is not too dry. These leaves will reach the height of a foot, and a breadth of about three inches.

One of the violets we loved when we were children, and have carried with us in our wanderings, is *V. pubescens scabriuscula*. *Pubescens* itself grows in this locality, though I think not very commonly, but the variety we have never happened to find growing except in a little copse by the side of that same "Jack's meadow," where we went for bloodroot, also. This is one of the branching violets, growing up to something more than a foot in height. It is more slender than *pubescens*, and almost entirely smooth. The rather small yellow flowers, with madder purple throat markings, grow singly on two or three inch stems, in the axils of the leaves. In a clump, this foliage also has a pleasant effect of several shades of green, though the greens are lighter than those of *eizanensis alba*, the leaves are rather thin, acute at the apex, and somewhat scallop-toothed.

The Canada violet, *Viola canadensis*, also branches, but is usually taller, and an altogether larger plant, sometimes reaching two feet in height. The lower leaves are broadly heart-shaped, of rather heavy texture, and about four inches across. The inch-wide flowers are white with a few purple markings. There is only one purple line on each of the side petals, which perhaps helps to give the flowers their decidedly impish air. The flower has a noticeable yellow throat, and a pale purple flush on the back of the upper petals. A

clump makes a lovely patch of cool green and white for at least two months, and there is scattering bloom all through the season. This species, like the preceding, seems to enjoy a little shade, though neither is very particular. The nameless white one romps all over the sunny side of the garden.

There comes to mind a line written in Greece about 600 B. C.—“Violet-crowned, pure, sweetly smiling Sappho”—a long time for a small flower to be beloved!

RACHAEL CAUGHEY

Antrim, N. H.

Witsenia maura Thunb. [See page 149]

It is odd to find a member of the Iridaceae, which is therefore a monocotyledon, rated as an evergreen shrub. It is so-called in Paxton's "Magazine of Botany" (Vol. viii, 1841), and Bailey in the "Standard Cyclopedia of Horticulture" says that it is an ornamental greenhouse shrub. It is found in South Africa.

Shrub or not, its oddity is of an engaging type. This writer does not feel with Dr. Pole Evans in the "Flowering Plants of South Africa" (Vol. i, Plate 34, 1921) that it "would only interest enthusiastic cultivators on account of its rarity." It is queer and rare but it is also rather intriguing.

It grows in swampy places of the Cape Province from a fibrous rootstock, its woody stems rising to two feet or more and its erect, stiff, sword-shaped, acutely pointed leaves rising in two vertical ranks and embracing the stem nearly to the top.

The flowers are peculiar. They grow in dense terminal heads, one (or two?) to a spathe, with an involucre of overlapping, rigid, smooth yellow to brown bracts. The tube of the flower is cylindrical, yellow to brown below, blue-black above, two inches long. The

segments are much shorter, erect, dark blue, the outer segments smooth within, covered on the outside with tawny-yellow hairs with a tuft of these hairs at the top of the inner segments. Style and stamens are threadlike, not protruding. The stigma is minute, 3-pointed. Ovary small, 3-celled, the capsule small, horny, splitting into three valves. Seeds few, angular. The flowers are said to be "sweetly scented."

The genus is monotypic. The flower long known as *Witsenia corymbosa* is now referred to another genus (*Aristea*). *Witsenia maura* was found by Thunberg on the Cape Peninsula and described by him in 1782. It seems to be found in damp places only. The local name is "Waaierijte."

Lt.-Col. Grey, in "Hardy Bulbs" (page 396, 1938), says that it flowers in June and July in England. Though introduced many years ago, it does not appear to be in cultivation at present. It should be well worth raising from seed, he says, and trying in warm southern gardens in damp loam and leafmold. He would not expect it to appreciate the swampy conditions which it requires in South Africa.

Paxton ("Magazine of Botany," Vol. viii, 1841) says it was introduced first to Kew Gardens in 1790 and to cultivation later. It should be potted in a soil composed chiefly of turfy leafmold, to which may be added a little open loam and sand. The plant, he says, must on no account be overpotted and peculiar caution is required to preserve it from superfluous moisture, which, if allowed to collect either in the air or about the roots, inevitably kills it. It should be placed in a light, dry and airy part of the greenhouse and if thus managed, there will be no danger of its being destroyed. Strange, is it not, that a plant which lives in swampy places in its native habitat, should be so cranky about moisture



South African Railways & Harbours

[See page 148]

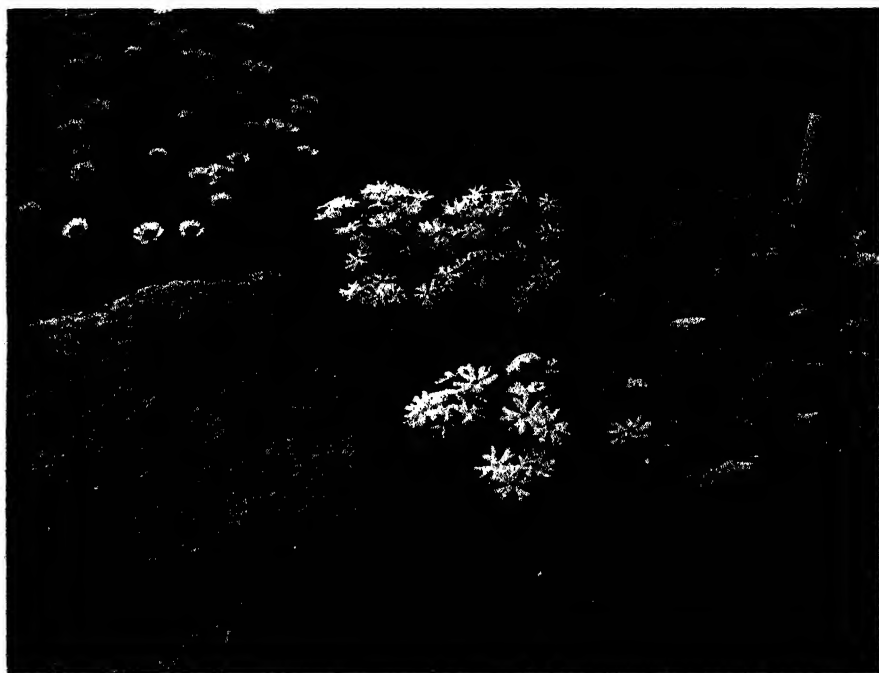
Witsenia maura

when under cultivation. It is probably a question of drainage.

Cuttings, Paxton says, of the young branches may be struck in a moderate heat, if dampness be properly avoided.

It was named for Nicholas Witsen, Dutch patron of botany in the first half of the 18th Century.

SARAH V. COOMBS
Scarsdale, N. Y.



Edgar T. Wherry

× *Phlox Henryae* at Gladwyne
(See notes page 151)

A New Hybrid *Phlox*

In an account of the eastern *Phloxes* and their horticultural derivatives published in this magazine several years ago (July, 1935, page 209) it was noted that hybrids between the species-pairs *bifida-subulata* and *nivalis-subulata* are in cultivation. The third possible combination within the subulate-leaved group can now be announced.

For some years Mrs. J. Norman Henry has been growing *Phlox bifida* and *P. nivalis* not far apart in her rock garden at Gladwyne, Pennsylvania, and about 1936 a seedling appeared which had evidently resulted from chance cross-pollination between them. Its leaves are intermediate between those of the parents in outline and size, and its flowers, though in size and color resembling *P. nivalis*, show the deep notches in the lobes characteristic of *P. bifida*.

This seedling proved very vigorous, and soon increased in size to the point where it could be propagated by cuttings, which strike roots readily in moist sand. The resulting plants are highly attractive rock-garden subjects, and will accordingly appear sooner or later in the horticultural trade, so a name for the hybrid is desirable:

× **Phlox Henryae**, hybr. nov. (*P. bifida* × *P. nivalis*).

Plant up to 15 cm. high; leaves linear-lanceolate to oblong-elliptic, up to 15 mm. long and 4 mm. wide; inflorescence - herbage glandular - pubescent; sepals 8.5 mm. long, united for nearly $\frac{2}{3}$ their length; corolla-tube 12 mm. long; lobes 11 mm. long and 9 mm. wide, notched to a depth of 4 mm.; color delicate lilac-purple, with striae forming a violet 10-rayed star in the corolla-center; stiles 5 mm. long, united for 4 mm. and free for 1 mm.

Planta inter *Phlox bifida* et *P. nivalis* hybrida. Folia lineari-lanceolata

ad oblongo-elliptica, usque ad 15 mm. longa et 4 mm. lata. Sepala 8.5 mm. longa, usque ad $\frac{2}{3}$ longitudinis conjuncta. Corollae tubus 12 mm. longus; lobi 11×9 mm., profunde (4 mm.) bifidi. Styli 5 mm. longi.

Type in herbarium of Academy of Natural Sciences, Philadelphia, collected by Edgar T. Wherry in garden at Gladwyne, Pennsylvania, May 6, 1939. Two photographs taken at the time of collection are reproduced herewith, the one showing the original plant growing just below a clump of typical *Phlox bifida*, the other a full-sized view of an inflorescence. EDGAR T. WHERRY

Propagating Tropical Water Lilies at Home

Get a tuber that has not been exhausted by propagation and keep it growing in a pan of rich soil and water—an inch or two of water is enough. Keep in hot sun all day and protected from night chilling. Tubers send up one to a half dozen plantlets. Then these develop white roots an inch or two long. Ease plantlets and roots free from the tuber and plant in three inch pots or in pint strawberry boxes of rich garden soil, kept in pan or tube with water to cover. These, too, need full sun all day and night protection until the weather is settled enough for outdoor planting. If you use boxes, break the edges gently and plant box and all in the mud. This involves no root disturbance and usually gives splendid results. Your tubers should soon make another crop of plants. Each plant will become a growing crown, unless my observation is erroneous. If you want a plant with many crowns, do not remove any of the second lot. If one or two crowns will satisfy you, remove surplus plants and pot up as you did the first lot.

Your education will not be complete until you try tropicals from seed. Flowers increase in size as the plants do, and

on well developed plants I thought the flowers the equal of those from named varieties in the same pool.

Seedlings resent transplanting. I like to broadcast the seed in shallow water in March or April and let it develop as it wishes. As late as this you could start a few plants in pint strawberry boxes of rich garden soil set in a pan of water to cover. Daytime sun and night protection are indicated here, too. I keep mine in a tub that I can cover easily at night. I mean a tub outdoors in a hot, sunny spot. Break box edges gently and plant box and all after the weather is settled. I do not, however, like to plant seedlings until after the rosette that soon follows the first lone leaf begins to send floating leaves to the surface. MAUDE R. JACOBS

Laburnum vulgare [See page 153]

The laburnum is associated in our minds with English literature, and is so attractive, it is a mystery why it is not more widely grown in this country where two species *Laburnum alpinum*, called Scotch Laburnum, although it is native to Southern Europe, and *Laburnum anagyroides*, called Golden-Chain Tree and several of its varieties and hybrids are hardy as far north as Boston.

The subject of this note, is called *Laburnum vulgare* by W. J. Bean in his book "Trees and Shrubs Hardy in the British Isles," but Dr. Rehder calls it *Laburnum anagyroides*. These two authorities also disagree on the common name, Dr. Rehder calling it Golden-Chain and Mr. Bean, Golden-Rain.

Whatever the name, the tree is one of the loveliest of many beautiful plants which bloom the third week in May. It always causes a thrill to see the branches thickly clad in pendulous, yellow racemes and silky leaves swaying in the breeze like a curtain of yellow

and green, and wafting the fragrance of honey-locust and sweet pea into the cool Spring air.

The tree grows twenty or more feet high and the main trunks branch fan-wise and low from the ground. The branches are round, smooth and green with short horizontal lines on them. When young, the branches are grey with soft hairs. The leaf stalks are $1\frac{1}{2}$ to 2 inches long, round, and grey-green because of the somewhat appressed silky hairs on them.

The leaves are trifoliate, each of the leaflets are rounded at the tip, soft to the touch, thin textured, and cedar green. They measure $3\frac{3}{4}$ inches across. When young, they are shiny and grey-green on the under surfaces because of the hairy covering. The midrib is quite hairy and projects a little beyond the leaf and is clothed with a tuft of hairs when young and later becoming more like a thorn.

The flowers grow on last year's wood, in cylindrical racemes $\frac{7}{8}$ inch long. They are pulse-shaped and each is on a pedicel about $\frac{5}{16}$ inch long. The calyx is green, two-parted and encircles the flower loosely. The large back petal or standard is marked with brown. Two thin petals or wings are at right angles and enclose the third the keel which is closed and enfolds the stamens and pistils. The flowers measure $\frac{5}{8}$ inch long and $\frac{1}{2}$ inch across and are "Picric Yellow." The stamens and pistils are combined at the base, the style and stigma are green. The filaments are green and the anthers deep gold. The fruit is a pod of light yellow-green, and glistens because of the hairs on its surface.

The seeds fall to the ground and germinate, forming little colonies around the parent plant, just as the Dogwoods and Judas Trees do.

Peekskill, N. Y. HELEN M. FOX



Walter Beebe Wilder

Laburnum vulgare

[See page 152]

Alsine pubera [See page 155]

The Alsines are chickweeds and belong to the Pink family. It is a pleasant surprise to find a worth-while garden plant in this group in the Great or Star Chickweed, *Alsine pubera*. According to Britton and Brown, it is found in moist rocky places in New Jersey, Pennsylvania, on to Indiana and South to Georgia and Alabama and in Carolina ascends to 4,500 feet. In New York it flowers from the second week in May but elsewhere sometimes in June.

Alsine pubera or hairy alsine is a most attractive plant with large soft leaves and dainty starry flowers. It has an effect of fluffy whiteness similar to some of the asperulas and gypsophilas. The plant has done well in shade and when in flower rises to five inches and has gradually spread to a foot and a half across.

The stems are fleshy and easily broken, many form a central clump, each with a tiny rootlet susceptible of division. The stems are glistening, yellow-green, round, softly hairy, branching and recumbent. The leaves are opposite, ovate, stalkless and with entire margins. Their surfaces are covered with tiny hairs and the large ones measure three inches in length and one and one-quarter inches across. They are pointed at both ends, widest at the center and in the specimen grown by me, their surfaces are faintly mottled with light and dark green. The flowers three to four in loose clusters, grow on pedicels rising from the termination of the stems. The corolla is composed of five petals so deeply cleft as to appear like ten strap-like petals and these are subtended by five-pointed oblanceolate green and furry sepals. The sepals stand out at right angles to the stalk as do the petals, giving the flowers a crisp

look. The white ovary is odd, being conical and like a button in the center of the flower. The three stigmas project from its tip and are also white. The stamens between the petals and ovary are white, with bean-shaped anthers and the pollen is cinnamon colored.

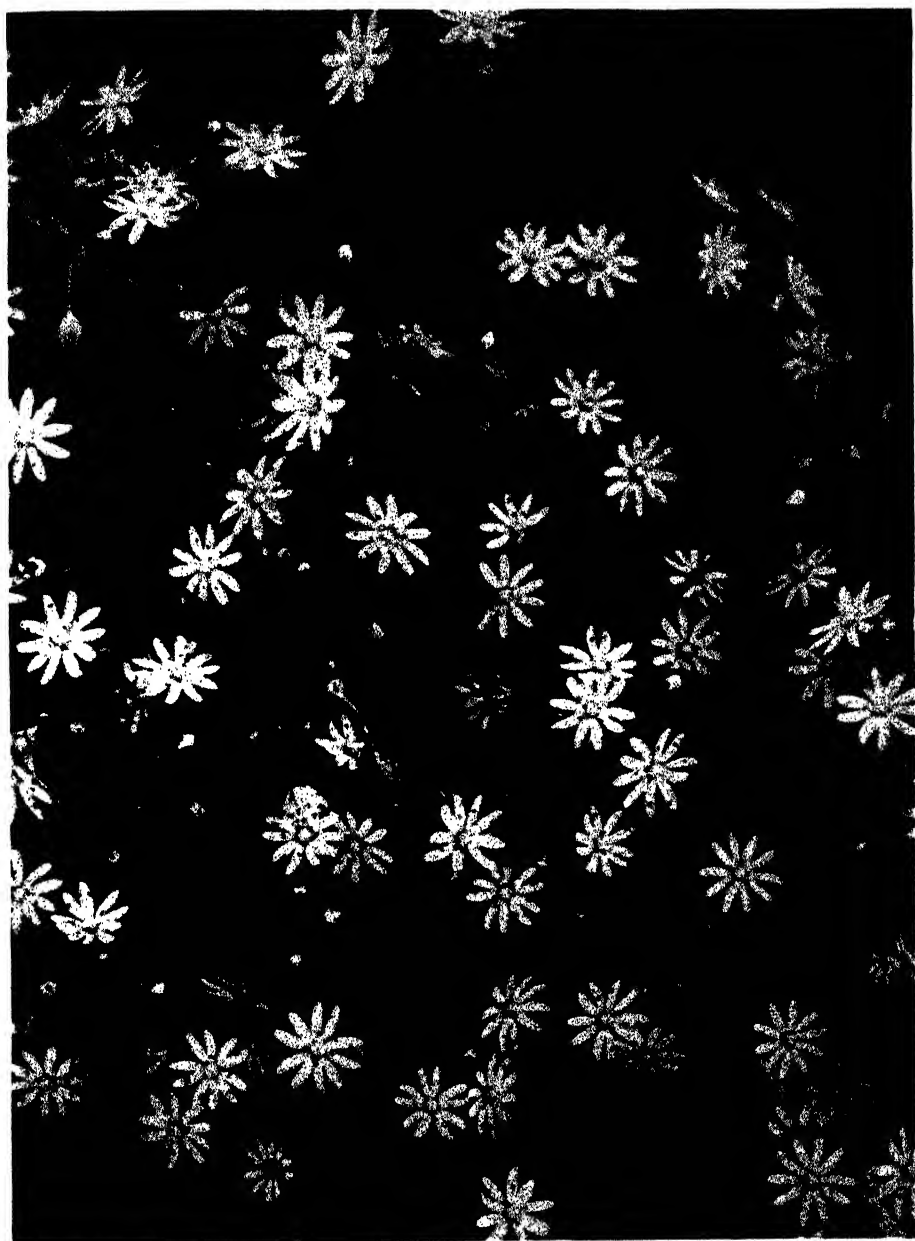
HELEN M. FOX

Peckskill, N. Y.

Cyrilla racemiflora

Our experience with this shrub in southern England may be of some interest to your readers, following upon the note and photograph in the issue for October, 1940.

In these Gardens, approximately 80 feet above sea-level, where winter temperatures only very rarely fall to zero Fahrenheit, and the average annual rainfall is rather more than 24 inches, several examples were planted about twenty-five years ago in acid soil under the shade of oak trees (*Quercus pedunculata*), and amongst *Vacciniums*, *Picris*, *Oxydendrum*, and other members of the Ericaceae. Here they receive only indirect sunlight in summer and the benefit of a thick annual mulch of oak leaves in autumn. No particular attention has been paid either to feeding or pruning. They have become seven or eight feet in height and almost as much in width, generally branching from near the base. The majority of the leaves are persistent throughout the winter, some of the oldest alone falling towards the end of the year; unfortunately they do not become brightly coloured, — merely a dull yellow,—although adjacent *Enkianthus* and *Vaccinium* species colour magnificently each season. The leaves may be described as oblanceolate, or obovate-oblong, $2\frac{1}{2}$ - $3\frac{1}{2}$ ins. long by $\frac{5}{8}$ —nearly 1 in.—wide; the upper surface is

*Walter Beebe Wilder**Alsine pubera*

[See page 154]

shining, the lower paler and dull with a fine network of veins; at the base they taper to a reddish stalk less than $\frac{1}{4}$ in. long. They are quite glabrous.

An interesting point is the time of flowering. Records at Wisley for the past five years show that this lies between late August and early October,

varying somewhat with the season; early to mid-September would be the average period of maximum flower.

No writer whom I have been able to discover records it as late as this in the wild state; Sargent says late June to early July, Chapman ("Flora S. U. S. A.") July, and Rehder June to July. On the other hand Bean states "late summer and autumn" (under English conditions) and an anonymous writer in "The Garden," LXVIII, 144, (1914), that it flowers at Kew during August and September. It has even been exhibited as late as November. (See "Jour. R. H. S." LI, cv. (1926). It appears therefore that the plant flowers about three months later in England than its native home, perhaps due to a differing amount of daylight, or temperature.

Another noteworthy fact is that no fruit has ever been observed here. Possibly this is connected with the late flowering season, paucity of suitable insects, or because the plants are of clonal origin and self-sterile. Observations on this point from those who have tested *Cyrilla* for self-sterility would be most instructive. Propagation may be achieved either by cuttings rooted under glass or by the adventitious shoots produced sparingly from the roots.

The present stock seems to have been introduced to England by Messrs. James Veitch about the end of the 19th century; an Award of Merit was granted to the shrub in London in August, 1901.

As it grows at Wisley it is an attractive semi-evergreen bush valuable for the delayed flowering season; if it bloomed in July most of its value would be lost or overlooked amongst the many other plants of all kinds flowering that month. In September it has the field almost to itself save for the hydrangeas.

It need only be added that it is en-

tirely hardy here, suffering neither from late spring frosts, summer drought, nor any other weather conditions to which we are liable.

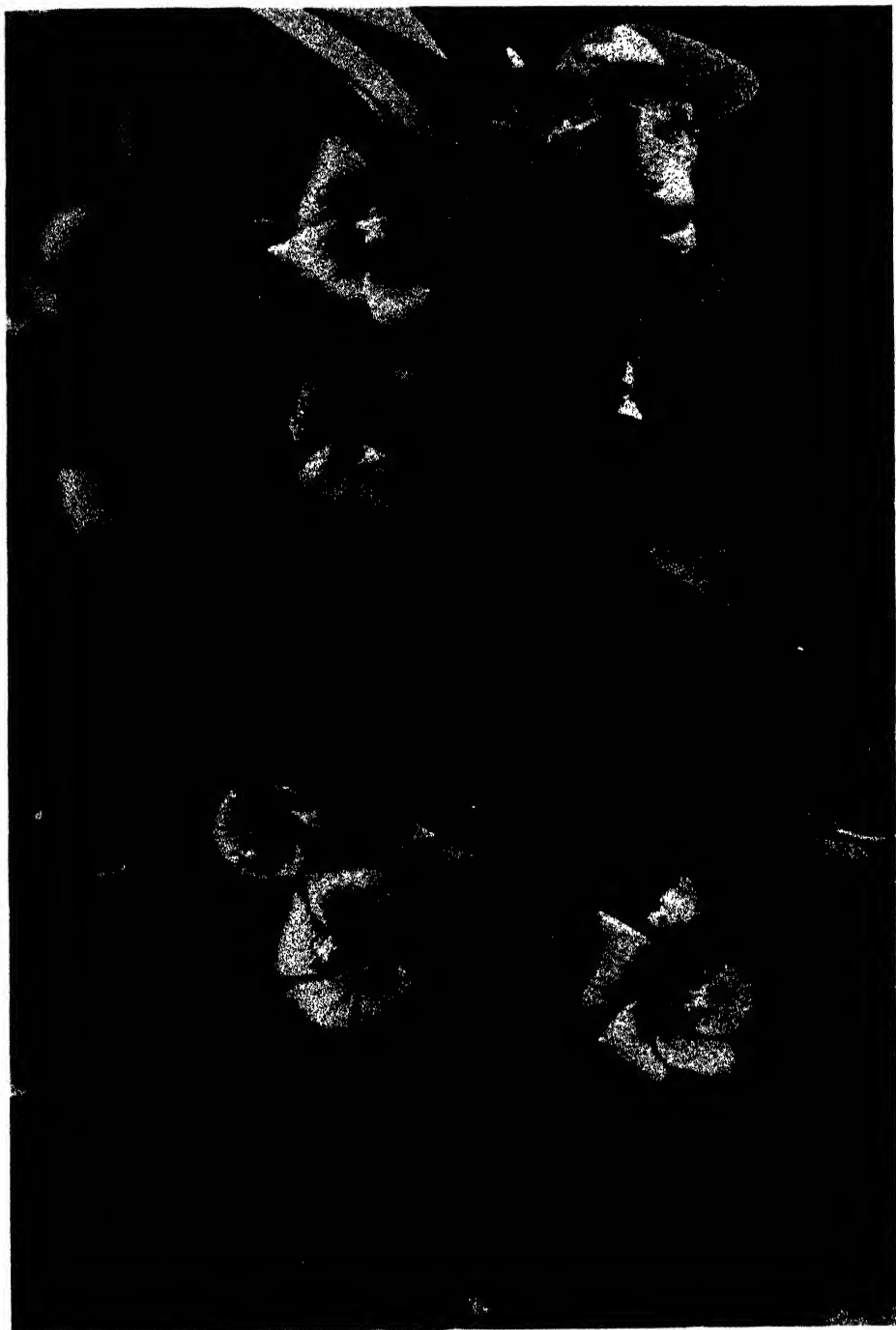
B. O. MULLIGAN

*Royal Horticultural Society's Gardens,
Wisley, Ripley, Surrey, England*

Cyrilla in Puerto Rico

Some time ago I saw your note in THE NATIONAL HORTICULTURAL MAGAZINE about the "shrub" *Cyrilla racemiflora* and now I see the longer, illustrated note in the October 1940 issue of that magazine ending with "our magazine would particularly like to hear from readers who have grown this shrub." When I read the first note I recalled frequently seeing this tree in the mountains of Puerto Rico.

It was in the Luquillo Unit of the Caribbean National Forest that I first became acquainted with this tree. There as elsewhere in Puerto Rico, it is called "Palo Colorado." A good name, for it is truly a red tree. In form it is never a tall tree for it reaches a height of only about 40 feet, but it is the largest in trunk diameter of any tree I have seen in Puerto Rico. A specimen three feet in diameter is not rare and I have seen them about five feet in diameter. The tree is conspicuous because of its red color, its profuse flowering, and its abundance in the forest. On the mountain tops at about 3,400 feet elevation it does become shrubby, as do many other species which are normally trees. In the fall and winter the leaves assume the autumn colorations we see in the north. Here, however, this species is never entirely free of leaves. It is a weed species in the forests of Puerto Rico. Its lumber is red and warps beyond use as it dries. The trunk seems susceptible to rots, for an old tree that is not hollow is difficult to find. In



H. F. Loomis

[See page 158]

Lagunceria Pattersonii

fact, it is because of this that this species is the favorite meeting place for the parrots endemic to the Luquillo mountains.

Lagunaria Pattersonii G. Don. [See page 157]

The first sight of this tree having been in southern California with a thin layer of dust overlaid on the naturally grayed foliage, it was something of a surprise to see the fine specimen at Coconut Grove, Florida. It is probably too easy to assume that most plants from the country of its origin would do better in the arid type of southwestern climate than in the humid southeast. Within its natural range, however, is Norfolk Island and this has a climate humid and tropical enough to support bananas. So in the end the whole matter resolves itself, as is so often the case, into a lack of complete knowledge.

In Florida one does not feel the intensity of grayness that California contributed and the pale pink flowers do not seem so washed out. How far north in the state it may prove of use is not reported, but as it has already been listed in trade catalogues it may be that it will be useful through most of the peninsula.

Maiden in his Forest Flora of New South Wales is worth quoting, particularly as he too quotes variously and pertinently.

"*Lagunaria*," a name given to this genus from its similarity to *Lagunaea* (D. Don, op. cit.) (Gen. Syst. 1485-Ed.). The name *Lagunaea* was given to a genus of tropical plants belonging to the same natural order, and now merged in *Hibiscus*, in honour of Andreas Laguna, a Spanish physician and botanist of the sixteenth century, who translated Dioscorides into his native tongue. *Pateronii* after Colone! Patterson, Lieutenant-Governor of New South Wales.

"The *Lagunaea Pateronii* is a native of Norfolk Island, from whence the seed were brought to England by Col. Patterson" (M.M. t. 769) in 1792 (according to Endlicher, Prod. Norf., p. 75).

"Habitat—Scattered on the grassy hills of Norfolk Island, it forms a spreading tree of 40 ft. in height. It is perhaps the largest plant known to exist, belonging to the Mallow Tribe. In a thick wood I met with it 80 ft. high, and with a trunk 16½ ft. around (Backhouse, p. 258)."

The Curtis Botanical Magazine t. 769 is not a very well colored plate and the note is uninteresting.

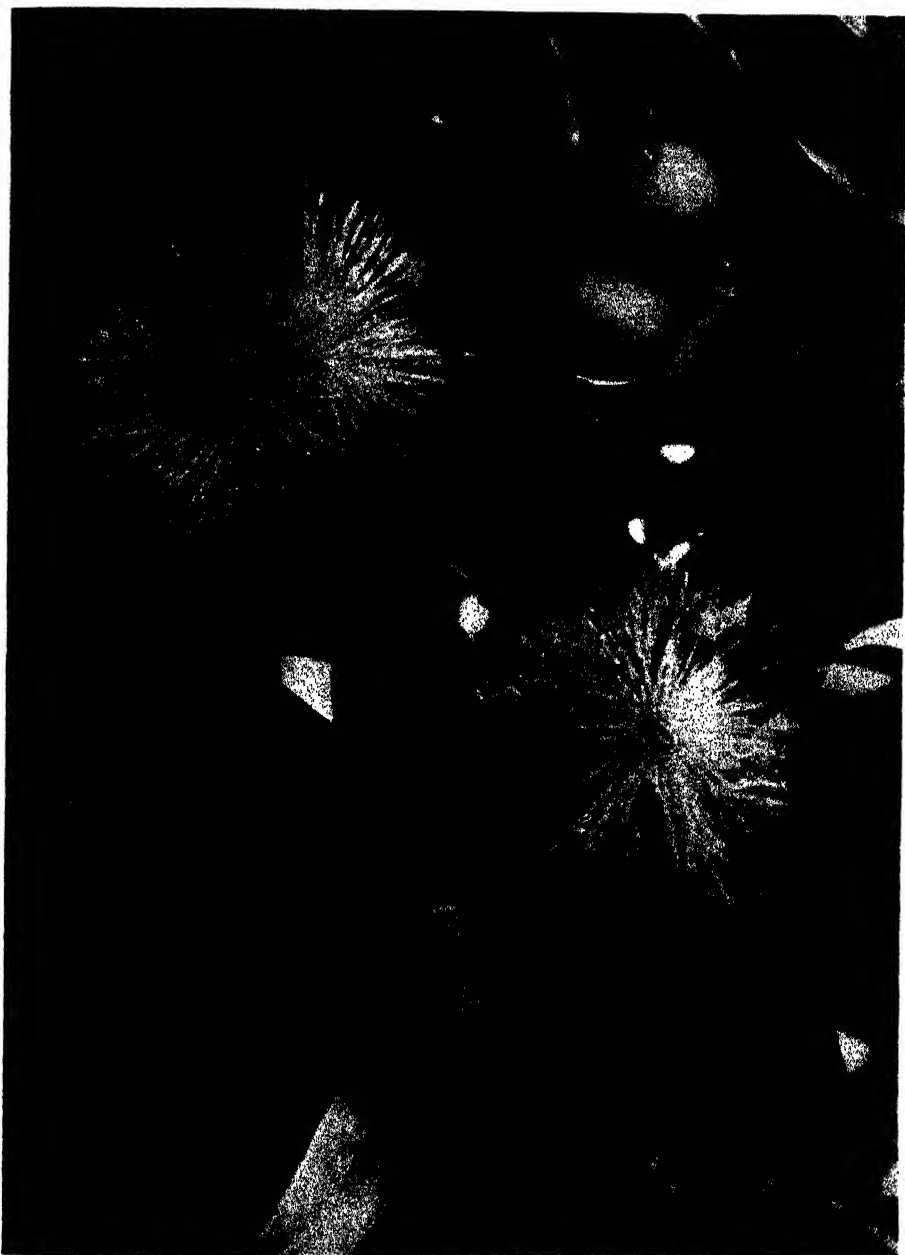
T. R. Sims, "Flowering Trees and Shrubs for Use in South Africa, p. 101 (1919), shows that it does well there." * * * * It seeds freely and is easily raised from seeds, but should be finally planted out while still small.

Eugenia Jambos L. [See page 159]

As far as this recorder is concerned, almost the whole case for the Rose-apple is summed up in the first paragraph of Wilson Popenoe's "Manual of Tropical and Subtropical Fruits" (p. 305) which reads:

"As an ornamental tree, the rose-apple is of value for all tropical and subtropical regions. As a fruit, it is beautiful and interesting, but is not much used except for making preserves." The reason for this moderation does not appear until the next page: "The fresh fruit is fragrant and attractive, but owing to its peculiar character it is not pleasant to eat unless in small quantities; yet as a preserve or crystallized it is delicious."

All this perhaps is not entirely fair, because one of the pleasures of going to Florida is to see, to smell, to taste all the strange new things and perhaps even to hear the prodigious tales of their several excellences.

*H. F. Loomis*

[See page 158]

Eugenia Jambos

Whatever one may feel about it as a fruit, the plant makes an attractive evergreen tree usually up to twenty-five feet or thereabouts with handsome

deep green leaves that are pinky-bronze as they grow. As can be seen from the picture, buds, flowers and fruits may be had at one and the same time al-

though one usually thinks of the main flowering season in Florida as March with the major fruit crop in June.

Other minor virtues are urged by Doctor Popenoe as: "On account of its beauty it (the fruit) is often used for table decoration. Its enticing perfume, strikingly similar to that of rose-water, makes it unique among fruits."

Recalling the beauty of several eugenias grown in California, often sheared as for hedges, one is tempted to wonder how well this might respond to similar treatment, and trimmed hedges are by no means to be despised in pseudo-tropical plantings since nothing accentuates luxuriance as the trimming or clipping of some nearby element. This may have been tried already and disproved. Certainly Doctor Fairchild's little *Eugenia coronata* from the Gold Coast trip will tolerate a certain amount of clipping without much interference with its intermittent flowering or the production of its black and puckish fruits.

Unless the reader should think the rose-apple is being discriminated against, it may be fair to say that Doctor Popenoe is scarcely more favorable to the six other eugenias which he discusses in the same book. As fruits, they have little praise, as ornamentals, they pass by some with mild acclaim.

The same sort of splendid curiosity must have attended its first flowering and fruiting in Britain in those days when the greenhouse for tropical plants was known as a "stove!"

Although Popenoe implies that one does not care for the fresh fruit, it is Rumphius, quoted in the *Botanical Magazine* with tab. 1696 (1815), who speaks plainly and discusses our plant as "one of the wild sorts of Jambosa, distinguishing it from the domestic or *Eugenia malaccensis* of Linnaeus by its smaller size, crooked growth of stem,

and austere, round-compressed fruit, which is seldom eaten in Amboyina, being less juicy, more insipid, and leaving a bitterish taste on the palate."

In *Hortus Malabaricus*, the flower is described "as at first white and scentless, afterwards turning yellow and acquiring an acid or vinous smell; and the fruit is said to be sweet and grateful, with a pleasant rose-like scent * * * *." Here again Rumphius, quoted in the *Botanical Magazine*, confirms the later dicta.

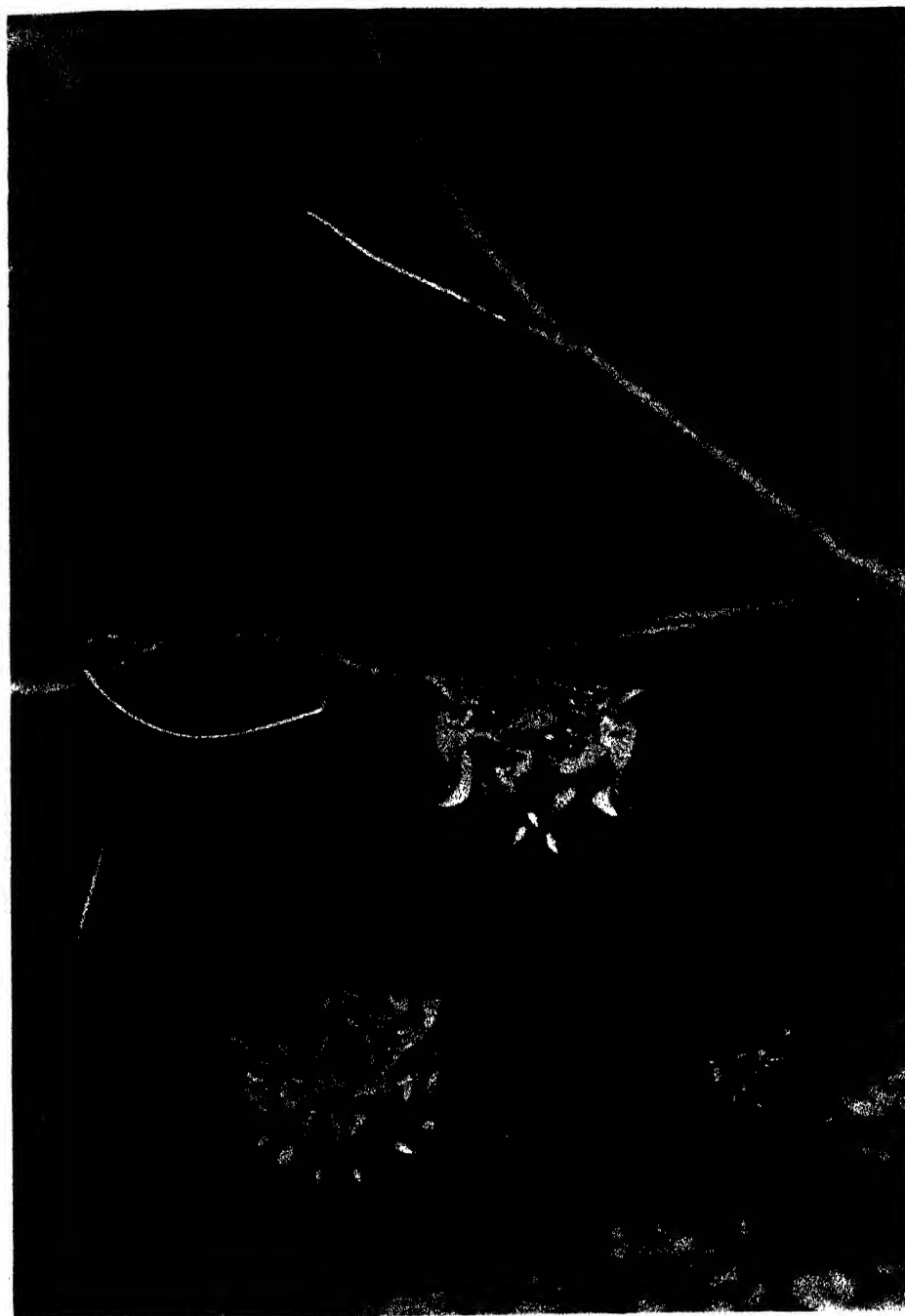
As a matter of pure curiosity, this species was looked up in Indian Medicinal Plants (1918) by Kirtiker, Basu and I.C.S., a book that seems as much given over to quotations as this small piece. They quote from Watt (Dictionary of the Economic Products of India, v. 3, p. 288):

"In Bhamo, Upper Burma, the leaves are boiled and used as medicine for sore eyes." Some of the other eugenias listed had other and more diverse uses.

So again the gardener here can be content to look on this as an ornamental tree and no more.

Mucuna Bennettii F. v. Muell. [See page 161]

This tropical vine from "the Fly River" in New Guinea which is illustrated on page 161, from the specimens once growing at Coconut Grove, Florida, is a tropical plant that will always seem improbable because of the tales that were woven about it at the office, its wonder, its beauty, its inaccessibility. One senses the same sort of unrest in Baron von Mueller's original description, Descriptive Notes on Papuan Plants, p. 63-65 (1876, since in his discussion he writes: "* * * * *M. Bennettii* has red petals according to Signor D'Albertis, thus differing from *M. pruriens* and *M. monosperma* in this respect; therefore this, if I rightly understand, is the one, about which the discovered expresses



H. F. Loomis

[See page 160]

Mucuna Bennettii

himself in rapture, 'as it was one of the most gorgeous sights there in the whole floral kingdom'." He describes the red color of the flowers as similar to that of *Methonica* or *Gloriosa*, and adds, "that the plant grew in the greatest abundance on the banks of the Fly River," and "that to see the pendulous masses of such flowers, covering the trees from the base to the summit even of the most lofty was one of the most beautiful sights to behold. * * * *

Similarly ecstatic praise was given by C. A. Monckton writing in *Taming New Guinea*, p. 283. "At the time we camped on the shore of the Agaiambu lake, I noticed on the bank of a stream leading into it, a *D'Albertis* creeper, with white blossoms instead of the usual vivid scarlet; I had never seen a white one before and have never seen it since. The *D'Albertis*, whose botanical name, by the way, is *Mucuna Bennettii*, is quite the most marvellous and beautiful creeper in the world; but as all attempts to transplant it, or introduce it into cultivation, have failed. No water color nor slickness of oils can reproduce the wonderful brilliance of the scarlet color of the ordinary variety of this plant; its blossoms simply strike one dumb with their startling beauty."

Now it is a far cry from the Fly River in New Guinea to even the warmest parts of Florida and the mind turns quickly from the thought of *D'Albertis'* quoted phrase describing the creeper covering the trees "even the most lofty" to the trees of the warmest Florida where trees of the present are not famous for their height. Nevertheless, at the U. S. Plant Introduction Garden at Coconut Grove, Mr. McClelland tells me that the vine had reached about fifteen feet and that in season it hung out or down its pendulous branches which end in the umbel-like

racemes so clearly shown in Mr. Loomis' picture. Unfortunately, the winter of 1939-40 was much too cold and its immigrant life has now ended.

Whether or not Doctor Fairchild, who yearned for it as for the moon, can conjure up the tropical valley of the Fly River from these few flowers, one does not guess; or whether Miss MacIlvaine, who fell in with his plans, has felt herself repaid, one need not ask.

For the inquiring gardener the sight of these curious inflorescences and the amusing flowers which, in the illustration, look like so many little dolls hung up in bunches, will always be a sight to see. He may even wonder at this diversity of form that brings such a member of the Bean Family to so conspicuous a place. And, if his imagination is really alive, he will make a thousand comparisons with other members of this almost universal tribe.

In the just published "New Guinea Expedition," Richard Archbold and A. L. Rand (McBride & Co., 1940) which deals with the "Fly River Area, 1936-1937," there are several references to the *D'Albertis* creeper. The most interesting, perhaps, is the passage on pages 80-81.

"The clusters of large, scarlet, pea-like blooms amongst the green foliage form one of the most spectacular sights of New Guinea. Their beauty makes river travel doubly pleasing. The best display was along the little waterway near the little island above camp. The large bunches of flowers seemed like blooms of the tree itself, not draped nor festooned but appearing like patches of burning scarlet. Here and there we had the magnificent spectacle of pendant clusters of the brilliant flowers like lighted paper lanterns hanging from a bare vine draped from tree to tree. * *"

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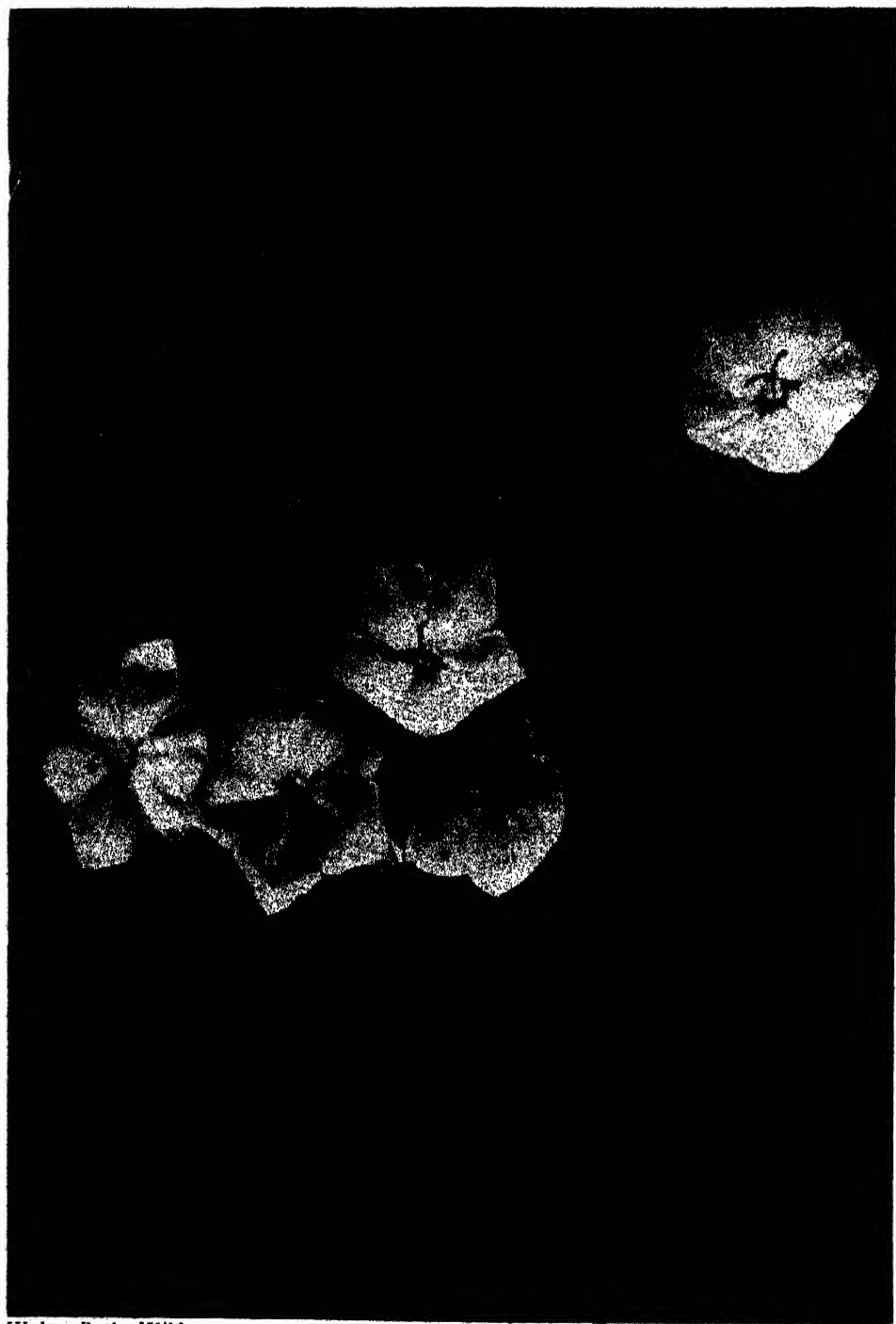
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JULY, 1941

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Walter Beebe Wilder

Campanula carpatica, White Star

Notes on a Few Campanulas Growing in a New York Garden

HELEN M. FOX

There is no planting which the blue and white campanulas do not enhance by their presence. The tall campanulas are lovely in the perennial garden and combine well with lilies while the dwarf varieties bring color and interest to the rock garden after the Spring bloom has faded.

Judging from the space allotted to them in the catalogues, the Canterbury or Coventry Bells, *Campanula Medium*, would appear to be the most popular of the family. The plants require experience and care to bring them to the flowering point and since they are biennial and die after blooming and the process has to be repeated each year, it would seem advantageous to favor other biennial and perennial campanulas which flower with much less attention. It must be admitted that although many of the other biennial campanulas are handsome, none of them is as showy as the Canterbury Bells.

A biennial with a quiet charm is *Campanula cervicaria*. The clusters of pale blue flowers are born in the axils of the leaves all along the two or three feet of hairy stems and form a terminating cluster at the tip. The stem is ridged, rough and covered with fairly long hairs. The sessile leaves are linear, toothed and covered above and below with rough hairs. They measure six inches in length and $\frac{3}{4}$ inch across and grow smaller as they ascend the stem. A peaceful effect is produced by the way they curve up and down again as they arch from the stem. The flower cluster at the tip is 2 inches across and 2 inches high. The leaves subtend the cluster and partially envelop it. The flowers are hairy, seven-eighths inch

long and five-eighths inch across. The style is blue, the three-parted stigma green and the pistil exserted. The flowers are white or grey darkened with "Bradley's Violet" and the leaves are "Spinach Green."

A much branched pyramid over three feet high, composed of slender stems ringing dainty bells is *Campanula patula*, called Spreading Bellflower, Wood Bellflower and poetically Fair-in-Sight. This campanula is biennial, thrives in semi-shade and in a fairly dry situation, so is doubly welcome for so few plants grow in these unfavorable conditions. It self-sows freely and once grown, is likely to remain in the garden. The stems and flowering panicles grow over three feet high and need to be staked. The stems are ridged and shiny. The leaves lower on the stems are somewhat spatulate, three and one-half inches long and about one inch wide while the leaves higher up are slender, pointed at the tips and vary in length from two to three inches with wavy and irregularly toothed margins. The flowers about an inch each way, grow in loose panicles, are rose-violet, the tips of the corolla lobes somewhat spreading and revolute. The sepals are united at the base, slender, and two-thirds as long as the corolla. The style is violet, hairy and the three-parted stigma is pale yellow while the stamens are straw-colored.

A pretty biennial is *Campanula barbata*. The basal leaves lie flat on the ground like spokes in a wheel. In the rich soil of the garden the numerous stems clothed with glistening hairs rise as high as twenty inches, although they

are said to be only nine inches high in the wild state. They bear racemes of pale violet nodding flowers at their tips. The flowers measure three quarters of an inch long and an inch across, and are shaped like open bells with slightly revolute, pointed lobes. There are fine hairs along the center of each petal, and the calyx is hairy too. The plants thrive in semi-shade and are handsome with *Lilium pumilum* and white Columbines.

There are some striking species among the tall perennial campanulas. The Clustered Throatwort, *Campanula glomerata*, flowers in June and has an architectural quality. The stems are round with sparse, short, stiff hairs and grow two feet or more high. The purple flowers are born in whorls in the axils of the long leaves and form a tight Victorian bouquet toward the top of each stem. The basal leaves have long petioles, are ovate, round at the tip, and roundedly and irregularly toothed. The stem leaves hug the stem, have no petioles, are opposite, from two to three inches long and grow shorter as they ascend. The flower clusters measure $2\frac{1}{4}$ inches across. The flowers are "Lobelia Violet" and sessile. The individual blossom is one inch long. The calyx is white at the base and the sepals are tipped green, hairy, pointed and linear. The corolla is tubular and flaring. The pointed petal lobes turn out gracefully and the style looks like white velvet, while the pale yellow stamens cluster at the base of the pistil.

In *Campanula glomerata* var. *acaulis* the stems are only seven inches or so high and consequently there is not enough space between the clusters, so that the flowers appear crowded.

Names with a Chaucerian flavor grace *Campanula latifolia* for, besides its name of Giant Bellflower, it has been called Gowk's Nose and Hask-

wort. The stems are four feet high and the clumps increase in girth every year. The only fault with the Giant Bellflower is that the life of each blossom is only a few days, but while they flower they are so brilliant a purple they fully deserve the large space they preempt the rest of the year. There is a white form but the flowers look as if they had been dipped in blueing and not been rinsed long enough afterwards. The stems of the plant are round and slightly hairy and unbranched. The leaves are coarse, hairy but soft to the touch, ovate and acute and without stalks. They measure six inches in length and over three inches across and have irregularly crenate margins. The flowers are boldly "Amparo Purple," bell-shaped and form a spike as long as seventeen inches. The sepals at first unite, then separate, clasp the corolla and feel smooth and cool. The corolla is thin-textured and one and three quarters inches long and one and one-half inches across. There are long silvery hairs on the margins of the corolla lobes. The ovary is white with a slight lavender tinge; the style is thick and the stigma, as is characteristic of the campanulas, is three-parted. A larger form is *C. latifolia* var. *macrantha*.

The whole plant of *Campanula lactiflora* is hairy, with rough hairs particularly noticeable in the flower heads and calyces. The stalks are leafy, sometimes grow six feet high and carry large trusses of white, or pale blue, starry open flowers. They have a sweet fragrance which is unusual in campanulas. When *Campanula lactiflora* is grown on a slope where it can follow its natural inclination and hang down, it not only looks highly decorative but also requires little attention. Elsewhere the plants have to be staked and where labor is scarce they frequently suffer from lack of attention at the right time,



Walter Beebe Wilder

Campanula cervicaria

and sprawl and grow untidy. The plant self-sows so generously it is likely to create a thicket of descendants around the original parent. *Campanula lactiflora* requires a partially shaded position and flowers from the end of June through July and sometimes repeats in August. The leaves are clasping, about three by two inches, pointed at the tip, and crenately and irregularly toothed. The sepals are long and pointed. The anthers look furry. The individual flowers are one inch across and the petal lobes are reflexed.

Several of the campanulas are too coarse for the border but look handsome in a semi-wild association where they can be seen in a mass effect as with tiger lilies or day-lilies. Along these is Throatwort, *Campanula Trachelium* and *Campanula Grosseckii* a similar but later blooming bellflower. Both are eighteen inches high and the principal distinction between them is that in *Campanula Grosseckii* a tiny leaflet turns down between each sepal which is absent in *Campanula Trachelium*. The stems of both are bristly with hairs, the leaves are coarse, crenately and unevenly toothed, the longest is two inches long and one and three quarters inches across. The flowers are hairy, violet blue and one inch long and are borne in the leaf axils along the stems in one, two or three.

Campanula punctata is coarse too but handsome, with long white bells and lush leaves. The much branched stems are twenty inches high, shiny, light yellow-green, ridged and slightly hairy with long green hairs. The basal leaves have stalks six inches long and are thin textured, widest at the base, and crenately and unevenly toothed with long hairs along the margins and on the veins of the under surfaces. Elsewhere the hairs are almost invisible. These basal leaves are three inches across and

four and one-half inches long rounded at the tip. The leaves on the stem are similar but with almost sessile and much narrower in proportion to their length. The flowers are borne in loose clusters or singly and their stalks bend sharply just before the calyx begins. The calyx is composed of five, long, toothed, narrow sepals, half as long as the corolla. In the space between them they form a growth like a fold. The corolla is two inches long and one inch across, with five short lobes, each with a sharp point in the center. They are very hairy inside with some purple lines and dots. The white style is half as long as the corolla.

Two campanulas with grey foliage, attractive for the garden and blending charmingly with herbs are *Campanula sarmatica* and *Campanula alliariaefolia*. *Campanula sarmatica* is medium sized with stems fourteen inches and clothed two-thirds of the way with flowers. Unfortunately it is not a hardy plant. The whole of it is grey and the stalks and leaves feel soft because of their fine hairiness. The blossoms are large, bell-shaped and pale violet "Light Mauve" over white and grow out of almost gray calyces. The lower leaves have long stalks but as they ascend the stem gradually become stalkless. The margins are sinuate and irregularly toothed. The leaf narrows almost to a point at the tip. The flowers have wooly stalks and wooly calyces tinted slightly with magenta. The sepals are joined together at the base, then spread apart and fold on either side of the center as they do in *Campanula punctata* and then narrow to their tips. The calyx begins in a tube with many ridges and two-thirds of the way up the sepal lobes, separate and are slightly revolute, narrow to the tip, are hairy inside and outside, particularly along the margins where the hairs are long. The pistil



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Campanula Trachelium



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Campanula Grosseckii



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Campanula patula

is a long pale yellow club. The flowers measure one and one-half inches across at the mouth and one inch high and are pretty, nodding and growing in the axils of leaf-like bracts.

Not quite as grey as *C. punctata* is *Campanula alliariaefolia* which has a soft wooly hairiness. It is absolutely hardy and grows in sun or shade. The stems grow two feet or more high and are topped by a loose cluster of cream-colored, nodding flowers, often a foot long. They are lovely with the slender yellow spires of *Digitalis ambigua* or *Digitalis laevigata*. The basal leaves are cordate with petioles six inches long and measure five inches in length and four and one-half inches in breadth. They are hairy on the under surface but practically smooth above. The blossoms are one inch long and in the calyx there is an appendage at the base of each sinus which looks as if a fold had formed between each of the pointed sepals. This is the type of growth present in *sarmatica*, *punctata*, and *Groszekii*. The petal lobes are hairy along the margins.

The list of flowers thriving in the dry shade is so short that the Peach-leaved Campanula or Beachbells, *Campanula persicifolia*, is most welcome. In one garden it seeded itself under the spreading branches of a spruce where its violet-blue, light blue or white flowers contrasted with the dark evergreen foliage and where no one would have thought it could thrive. But it flowers more freely in sunnier situations and where the soil is not quite so acid.

All winter the tufts of slender foliage, shaped like peach leaves, persist on the *Campanula persicifolia* and in summer the stems as straight and vertical as plumb-lines carry terminal racemes of bowl shaped blossoms. The plants are extraordinarily vigorous and floriferous and in time grow into wide mats. A

blue-flowered plant once bore seventy stems and a white variety sixty-five, with flowers measuring an inch and a half across. The double varieties such as *Moerheimeii* with white and Telham Beauty with dark violet flowers, when grown from seed will not all come true but a few will reward the grower.

There are many delightful alpine species of campanulas. Most of them require moraine conditions, with a deep, cool root run but a few will do well when shaded by taller plants or in the half shaded border, well at the front.

Campanula carpatica is the most satisfactory of the low perennial bellflowers and does equally well in sun or semi-shade. In the sunny border, at the feet of phloxes it spreads into fat plants with stems and seeds itself freely. The new varieties have larger and more saucer-shaped flowers than the type and are more dramatic in their appeal, yet the parent type with its tangle of thin stems bearing quantities of saucer-shaped flowers is delightful, especially when grown in drifts and with the different colors intermingled.

The stems of the *Campanula carpatica* are smooth and round, the leaves are toothed, have a few hairs on the under surface and are ovate and long-stalked. The petal lobes are shaped like the Mohammedan arch or a baroque bracket, with two curves meeting in a point. Of the new forms, var. Isabel has deep violet-blue flowers, White Star is a white version of Isabel, and Riverslea has dark violet flowers two inches across while Porcelain Blue, one of the best, has flowers in a lovely tone of pale blue. The stems and foliage of *Campanula carpatica* var. *turbinata* are hairy. At one time, this variety was classified as a separate species but once again has been returned to a varietal classification. It is difficult to get the true *turbinata* from seed, but after



Walter Beebe Wilder

Campanula Cecilio

many trials one is likely to succeed.

A low gem with bell-shaped blossoms is *Campanula caespitosa*. The species is exceedingly floriferous and carries grey-blue bell-like flowers dropping to one side of the stems. It was formerly called *pusilla* because of its smallness but perhaps *caespitosa* suits it better because it describes the tuft-like habit of growth.

There are several species similar to *Campanula Poscharskyana* which comes from Dalmatia. The plant is starred with blue flowers and spreads mats sometimes three feet across over rocks and is exceedingly hardy. The stems are round, sometimes hairy and very long. According to Dr. Bailey they grow to two and one-half feet, but are much shorter in my garden. The basal leaves on four-inch petioles are cordate-ovate, and toothed. The blade is one and one-quarter inches across and equal in length. The stem leaves are much smaller and have shorter petioles. The leaves are hairy on the upper surface but sparingly on the under side. The flowers are wide open. "Light Wistaria Violet" and borne in loose racemes along the stems and at their termination. They bloom in late June and last

deep into July. The sepals are slender, pointed and less than a third as long as the corolla and with hairs projecting from the margins as also from the veins and ribs of the calyx. The pointed petals overlap at the base. The stigma, the upper half of which is purple, is exserted and bears aloft its three-parted stigma. The stamens project a little in the spaces between the petals. The flowers are one-half inch high and three quarters inch across. There is an elegance and charm about the whole plant and it does well on half shady banks.

There are true annuals among the campanulas too. A particularly pretty species bought as *Campanula Cecilii* is a little plant with roughly hairy stems and leaves. The flowers are carried at the tips of the stems which are much branched and about ten inches high. The leaves have sharp points extending from the margins and are distinguished by three parallel veins. The open bell-flowers are blue and oddly have red lights showing through and appear ruddy when the flowers are held against the light.

Peeckskill, N. Y.

The Moutan Tree Peony

JOHN C. WISTER

THERE is no small shrub which has a more interesting or more romantic history than the tree peony, nor is there any which will give an equally spectacular bloom. In spite of all this the tree peony has been but little known in this country, even though it has been cultivated here for at least 130 years.

The longest known tree peony is the Moutan, the name being derived from the Chinese Mow tan, or Muh tang, or Meu tang. The botanists now call it *Paeonia suffruticosa*, although it is much better known as *Paeonia moutan* and *Paeonia arborea*.

The Moutan tree peony grows wild in the Province of Kansu in China, to a height of five feet. The wild forms, which have both purple and white flowers, have been discovered only comparatively recently. There is practically no literature about them, most of the historical, artistic, horticultural and botanical references being to garden forms originated by the Chinese, some of them nearly 1,500 years ago. Even the most ancient of authors mention it as a flower long cultivated, and it was known to our western civilization from the Chinese designs and poetical references long before there was any real interest in the plants.

The tree peony first reached this country from England some time between 1800 or 1810. Some of the pioneer American nurseries offered tree peonies as early as 1828. There were articles about them in American gardening papers as early as 1836, when Marshall P. Wilder, president of the Massachusetts Horticultural Society, exhibited one hundred cut flowers in fifteen varieties. Prof. Sargent brought in one of the earliest Japanese

collections in 1892. The largest public planting today is that in Highland Park, Rochester, where there are many thousands of plants 3 feet or more in height, practically all of them seedlings raised from original imported plants which later died. The largest public collection of named varieties as far as I know, is that at Swarthmore College, which comprises over 200 kinds, mostly of Japanese origin but some of Chinese, European and American growing.

There are several good commercial collections in this country from which plants can be purchased at prices that are reasonable in view of the slowness and difficulty of propagation.

I will tell later something of the history of this beautiful flower because it seems so little known. A few notes on cultivation are first in order. In spite of all that has been written about it, and all the trouble people have had with it, I do not think it should be regarded as a difficult plant to grow in the great geographical section of this country bounded by Boston, Cleveland, Cincinnati and Washington. Further north and further west it may be tender when the thermometer drops to 20 or 30 degrees below zero. Further south it may be unusually subject to injury by spring frosts, because there it may start into early growth in January or February and then be injured by a temperature of 27 or 28 degrees.

But inside of this great geographical rectangle, gardeners ought to try it oftener. It will grow in any reasonably good garden soil and should be planted in September or October and well mulched. It may be wise also to tie up the tops to prevent winter injury by rabbits. The really difficult

time in the life of the tree peony is in early spring, and more specifically the last week in March and the first few weeks in April, in the region of Philadelphia. A few warm days at this time will bring the flower buds out rapidly. Then we are apt to have many nights when the thermometer may drop to 31 or 30. This temperature apparently does not hurt the buds if they are protected from sun the following mornings, but a temperature of below 28 will then ruin the flower buds as well as destroy much foliage. It is generally recommended that a north slope may be safer than a south one because it keeps the plants dormant later, and that there should be evergreen trees to the east to break the early morning sun.

Lime is undoubtedly good for all tree peonies. If the soil is not of the best it may be improved by adding some humus or well rotted cow manure and some wood ashes or bone-meal.

In addition to winter attacks by rabbits, the stems may be hurt occasionally by San Jose scale, which can of course be controlled by a late November spray of miscible oil. A summer danger, particularly after sudden temperature changes or foggy weather is botrytis, which causes a wilting of the stems. Most persons can control this by cutting and burning the affected parts, but some experts recommend a Bordeaux spray as a preventative.

The tree peonies can be propagated by seed which some believe to be the safest and surest method of getting healthy plants, but most people find a good deal of difficulty in getting more than a small percentage of the seed to germinate. Prof. A. P. Saunders has been exceptionally successful with seed, which he stores in a root cellar.

Propagation of named varieties is best done by grafting on herbaceous

roots about the second or third week in August. This is not a difficult process for anyone who has had practice in grafting other plants. Even the most skilled propagator, however, does not get as high a percentage of success as he does with apples, pears, roses, etc., probably due not so much to the lack of growth between the stock and cion as to the often discouraging refusal of the stock to send out quickly the needed young feeding roots.

The number of grafts which can be made from a given plant is limited because while the plant is called a tree peony and has woody stems, a large proportion of the new stems do not produce eyes in the leaf axils. Therefore this part of the new growth of the year dies back like an herbaceous stem and cannot be used for propagation. It is probably this habit of the plant which more than anything else will prevent large scale mass production such as is common with roses. For all these reasons gardeners must expect to pay from \$3 to \$5 or \$10 a piece for plants.

Many members of the American Peony Society have done fine work with the tree peony and it is because of them that a few American nurseries have been willing to undertake propagation. It is certainly my hope that these nurseries will have profitable sales, for if they do not they cannot be expected to continue to grow the plants. If the American gardeners refuse to pay a proper price for a plant so difficult and slow to handle, they cannot expect to purchase the tree peony. They will instead more and more have to confine themselves to shrubs of the type of California privet, and plants like zinnias, verbenas and marigolds, which can be produced in enormous numbers very cheaply and quickly.

I shall not write about the beauty

of the flowers of the tree peony, for I assume that every reader of the NATIONAL HORTICULTURAL MAGAZINE will have seen the flowers or at least paintings or photographs of them. Few if any outdoor plants have such a great range of color. They begin with white and go through rose pink, salmon pink, rose red, scarlet, crimson, purple, magenta and various shades of magenta to lilac pink. These latter colors are difficult to use and should be kept by themselves. And of course the most brilliant of the scarlets should not be planted too close to pinks. In the main, however, there need not be much fear of color clashes among well spaced plants and the ample foliage acts as a peacemaker between the various colors.

No one knows how long a given plant may live in this climate, but I personally know of a number which have been grown near Philadelphia for more than a century. Apparently the first hundred years are not the hardest but certainly in the first five or ten years even with the best of care there will be losses higher than those expected with other shrubs. After that there should be less and less difficulty.

The ancient Chinese considered the tree peony an improved form of the common herbaceous peony, possibly because they revered it for its ornamental value, while the herbaceous peony was valued only for its supposed medicinal properties. Apparently some of the old Chinese gardeners believed or pretended that with their gardening skill they had produced the tree peony from the herbaceous peony. In any event they called it the King of Flowers.

As early as the year 750 the Chinese enumerated by name as many as thirty different varieties, with fantastic descriptions in the Chinese manner, such as "Thousand Petaled," etc. Some of the most ancient of these descriptions refer to yellow varieties, but it is now

believed that white varieties with prominent yellow stamens were referred to. Perhaps the color was produced by dyes. The true wild yellow tree peony, a separate species, *Paeonia lutea*, was not discovered until 1849 and apparently the ancient Chinese gardeners never did possess it. Some people think that the belief in yellow varieties may have come from the common name of a white variety, which meant "a hundred ounces of gold."

One of the members of the Dutch East India Company who visited China in 1656, wrote an account of the trip and described tea, pineapples and tree peonies, the latter being "like roses but twice as large and without thorns." These stories apparently were not believed and it was not until more than a century later, about 1784, that Sir Joseph Banks, who had seen also certain Chinese drawings, believed that there might be something in them. He asked travelers of the British East India Company to look for the plant. One of them, a doctor by name of Duncan, sent to England a plant which flowered at Kew about 1787. It was named *Paeonia Moutan Banksii* and was propagated in Europe quite early.

Some of the early tree peonies in England created quite a sensation. One bush at the age of twenty-four years is said to have been 7 feet high and 40 feet in circumference, producing 660 buds. Another plant at fourteen years of age was 5½ feet high and 27 feet around. The plants in the early years of the century sold as high as ten guineas apiece.

Nurseries in England, France and Germany began as early as 1836 to list many varieties with long Latin names. The French plants were reported to have sold as high as 1500 francs.

In the early 19th century importations to England many plants perished. It has been charged that the

Canton merchants deliberately cut off the roots before potting, because they did not want the plants to live. Some even have intimated that the Chinese scalded the seeds before they sold them to foreigners. It seems quite evident from old gardening records that many thousands of plants were exported from China to Europe in the first half of the 19th century. These were supposed to include hundreds of distinct and superior varieties, but when they bloomed they proved to be the same five or six which had been imported between 1780 and 1810. Robert Fortune, who went to Central China in search of plants about 1840, brought back from Chinese gardens the first really desirable varieties. It may be noted that his varieties were the finest ever brought from China, and that apparently there is no record of any new Chinese varieties having been imported since.

There were, of course, disappointments in those days when the so-called black peony bloomed and turned out to be merely a deep purple, and when the recommended wistaria-blue varieties were merely a magenta-lilac, but on the whole the reception given to the plants was enthusiastic. During the 60's and 70's one nursery firm claimed to have 350 varieties while another one advertised 25,000 plants for sale, which is certainly more than there are in America today.

The tree peony was introduced from China into Japan in the 8th century by Korean and Chinese monks, and its name was soon changed or corrupted to Botan, which is still the Japanese word for peony. Old Japanese authors speak of as many as 500 or 1,000 distinct kinds. The records of the Japanese gardens are so reminiscent of certain Chinese stories that it seems likely that the stories, as well as the plants, were imported. Among these

stories are references to a variety called a "Thousand Petals," to a black peony and to one for which wealthy people used to pay one hundred ounces of silver.

The first European references to tree peonies in Japan are in 1712, and they are contained in a short note written by the botanist, Kaempfer. Thunberg a little later described it more fully but later travelers omitted any mention of it, which may have been because they thought the varieties they saw were identical with the Chinese varieties which had been sent to Europe. It was not until about 1890 that any tree peony plants were exported from Japan to this country.

By that time publications both in Europe and in this country were quoting remarks from various Japanese gardening manuals about them. These manuals contained often the most minute directions for preparing the soil and such curious statements as that the entire soil must be changed every year or else the plants would stop blooming after five or six years. Some old references insist that the only proper date for transplanting is the autumn equinox or the day before. Even more curious is the statement that the soil must never be tamped with the foot but left loose. Fertilizers such as ashes from burned straw, rape-seed oil-cake and fish are mentioned.

The Japanese seem to have been very much afraid of superfluous moisture or burning sun, and plants had to be protected from each. One old gardening book says that stems have to be scraped each autumn with a spoon of willow wood, and then rubbed with linen "containing a camellia fruit," to give an oil polish. One Japanese author, however, who gives most minute directions for cutting out worms with bamboo needles, later remarks that "a plant attacked with rot often suddenly

dies," and that "individuals must work these things out for themselves," which if not particularly enlightening certainly is philosophic.

Tree peonies flower in Japan about the first of May. It is common practice to remove two or three of the buds to make the remaining flowers larger. Many of the plants are grown in pots and during blooming period placed under bamboo or straw mats to shade them. It is evident that the Japanese are willing to take much more trouble over their flowers than we are, and that is perhaps why they had developed this particular flower to such a marvelous degree. The poet Tung Po states, "the flower of monarchs should be visited in the morning. He who would see their splendor in the afternoon cannot be considered a good judge."

While preparing my tree peony article for the Manual of the American Peony Society in 1928 I spent many days looking up tree peony literature. When all of the many articles were assembled it was amazing how few of them contained anything whatsoever of value. Most of them were practically copies (without credit) of one or two excellent articles written in the 1820's. All of them travel in a circle of ecstasy about the beauty of the flowers; the hopes of immediate great popularity; the astonishment that the plants are little known; the dangers of spring frost; and the propagation difficulties.

It is curious that it took botanists so long to discover the original wild species in Western China. Hugh Scallan and G. Giraldis first discovered it in their travels between 1890 and 1896, but did not collect any living plants or seeds. In 1910 Purdom found it and sent seeds to England and to the Arnold Arboretum. In 1914 Farrar came

across it again and his well known gift for description is amply illustrated when he tells about it in his book, "On the Eaves of the World:" "So I sat at last and rested, gazing down the steep loess tracks to the little village so pleasant-looking in its grove of poplars, till my eye was caught by certain white objects farther along the hillside, that were clearly too big by far to be flowers . . . Through the foaming shallows of the cove I plunged, and soon was holding my breath with growing excitement as I neared my goal, and it became more and more certain that I was setting eyes on *Paeonia moutan* as a wild plant. The event itself justified enthusiasm but all considerations of botanical geography vanish from one's mind in the first contemplation of that amazing flower, the most overpoweringly superb of hardy shrubs. Here in the brushwood it grew up tall and slender and straight, in two or three unbranching shoots, each one of which carried at the top, elegantly balancing, that single enormous blossom, waved and crimped into the boldest grace of line, of absolute pure white, with featherings of deepest maroon radiating at the base of the petals from the boss of golden fluff at the flower's heart. Above the sere and thorny scrub the snowy beauties poised and hovered, and the breath of them went out on the twilight as sweet as any rose. For a long time I remained in worship and returned downward at last in high contentment. . . ."

I hope that more and more readers of NATIONAL HORTICULTURAL MAGAZINE will want to try this fascinating plant in their own gardens and I can promise them great pleasure if they do so. I will not, however, guarantee immunity from exasperation!



The pit—South and West

The Sun-Heated Pit in Virginia

VIOLET NILES WALKER

THE recent revival of interest in the "Heatless Greenhouse," which has found such adequate expression in Mrs. Taylor's admirable book "Winter Flowers in the Sun Heated Pit" moves me to offer a few further notes on this interesting topic. I say "revival," advisedly, for though the sun-heated pit may be a new discovery in New England, throughout the Upper Middle South generally, and Virginia and North Carolina especially, sun-heated pits have been in use for generations.

Indeed, few of the older country farm houses, and even homes on larger estates, have been without their "greenhouses" as they were called, where, in addition to the storage of vegetables in

winter there were grown such cherished potted plants as the house windows could not care for regularly, but which could be brought into the house when in bloom, such as a gardenia or two, always a *Camellia japonica*, calla lilies, etc. It is true that these greenhouses were not developed aesthetically to the high level now reached, partly because explorations into suitable plant material were far more limited in extent, and largely because the utilitarian side had been the primary factor for their construction. They grew out of the underground storage pits used to carry over winter vegetables, together with such potted shrubs as needed protection and a rest during the winter

months, and the date when the use of glass opened up new possibilities in adornment is not at the moment, available.

However, tradition has it that sun-heated pits are known to have been constructed in Piedmont, Virginia, shortly after the Revolution, possibly earlier, and during the early eighteen hundreds they were to be found in almost universal use.

Moreover, after 1861, when life changed for the Southern rural dweller of all ranks, and labor was long to be non-existent for many who had previously enjoyed ease and beauty of life, these little greenhouses had to take the place of any outside garden. The potted plants, which could be nursed during the winter, and moved to strategic spots at the front of the house for summer, constituted, in many cases, the only possibility of flower adornment, so that the almost infinitesimal space had to be carefully balanced between winter and summer bloom.

Yet, simple as they are, the possibilities for development of bloom are greater than is realized at first glance, for although any attempts at regular garden making with such materials as are now successfully used, were unthought of, the list of plants long in use that could stand low temperatures is unexpectedly large, while an enthusiastic flower lover with a "green hand" and the needed patience, could keep a fine display of bloom throughout the winter. Many of these plants still exist, handed down for several generations, such as eighty-year-old lemon verbenas or "citronalis" (*Aloysia citriodora*) a fifty-year old *Camellia japonica*, oleanders thirty-five to forty-five years old, etc., to say nothing of rare tropical plants whose owners knew nothing of their botanical nomenclature, simply cherishing them under pet names, as for instance *Marica*, known only as the

"House orchid," *Euphorbia splendens*, the Crown of Thorns, or *Euphorbia pulcherrima*, the Christmas flower, calla lilies, abutilons, impatiens, chrysanthemums, amaryllis, *Asparagus Sprengeri*, zephyranthes, geraniums, Kenilworth Ivy, *Plumbago capensis*, tender ferns, etc., etc., are the plants most commonly met with, while here and there are still found rare and unlooked for varieties.

These pits are of various construction, some of brick, some of wood, and a few of stone, these latter being largely underground, with only a small portion exposed to the sun. Some were architecturally ambitious, planned to fit into the design of the home ground, others were more purely utilitarian and located unobtrusively, though always convenient of access from the house.

In Madison County, one of Virginia's mountain counties, where the winter temperature drops once in so often to twenty below zero, and almost every year touches zero several times, several of these houses may be found, ranging from seventy-five to one hundred and fifty years in age.

The lean-to type prevails. The position of the glass sash, however, is the reverse of the generally accepted form followed by the modern New England pits. The sloping side faces north, and forms the heavily insulated roof, while the upright side of the lean-to is entirely of glass, facing always south, and giving the greatest possible amount of sun.

At Woodberry Forest, one of the estates developed about 1785 by General William Madison (a brother of the President) from the original grant of land to his grandfather, Ambrose, there is a simple but effective development of the heatless greenhouse or pit.

This pit follows the general type of a lean-to, with the roof sloping to

the north. The outside walls are clapboard, the sloping roof shingled, the inside walls tongue and grooved. There is an eight inch space between the outer and inner walls, with twelve inches between the shingled roof and the inside ceiling, and these are tightly packed with sawdust to provide the insulation. The upright front which faces due south is entirely glass, the four doors being fitted with a double thickness of 10 by 12-inch panes. The entrance door is at the side, with two steps down to the floor level. A four foot walk crosses the little house, and on the right there is a shelf, fourteen inches wide, running across the front, at the base of the windows. On the left are five removable shelves, fifteen inches wide, rising like steps across the back wall to within eighteen inches of the sloping roof. Under these shelves are placed half dormant tender shrubs which only need rest and shelter during the short winter months.

The temperature of this house sometimes falls very low, but where ambition attempted over-tender plants, as was so often the case, an ordinary oil lamp—even a lantern, kept burning on extra cold nights, afforded ample protection. The uses to which the pit can be put are many and varied. It is in constant use for early raising of plants from seeds, for developing lily bulb-lets from scales, or from stems, or for rooting cuttings. Tender perennials of special value, which are wanted for cuttings for succession, are potted in the fall and placed here, and will continue their bloom far into the winter.

While some of these cool green-houses have been abandoned, as in one case where a fig bush was allowed to gradually drive out all other occupants, many still exist, and today some are advancing along the aesthetic side in company with general modern horticultural development.

Propagation of Hybrid Azaleas by Means of Greenwood Cuttings in Outdoor Frames

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SOME unfortunate misconceptions are prevalent concerning the requirements for propagating and growing azaleas; actually they are more easily handled than is generally supposed. Greenwood cuttings of some species root with exceptional difficulty, but none of these was a parent of the hybrids used in the following experiments. With these exceptions few plants are better suited to quantity production by vegetative means. An outdoor frame of the type described previously in this magazine* is ideal for the rooting of cuttings of many of the hardy evergreen or semi-deciduous Asiatic azaleas and their numerous selected clones, both of collected forms and of hybrids.

OBJECT OF THE EXPERIMENTS

Several objectives were sought in this study. Perhaps the primary was a test of the suitability of ordinary cold frames to quantity production of azaleas. Another was a measure of the lasting benefit secured from the use of growth substances on cuttings which are to remain in the frame for long periods; in these, mere speed of rooting might prove an advantage not worth securing. A question has been raised as to the advantage secured from use of growth substances on cuttings which root freely without treatment.

PARENTAGE OF THE CROSSES

The 550 clones used in these experiments were selected from a large num-

ber of hybrid seedlings produced by Mr. B. Y. Morrison and associates; these clones were derived from about 100 parent combinations using as a basis not only the type form but also various strains and clonal selections within the section *Tsutsuji*.

As might be expected, the seedlings included a wide variety of forms and colors, covering a long season of bloom. Some of the seedlings combined the large flowers and varied colors of the forms useful only in the South with the hardiness of both wood and flower buds, characteristic of the types useful in the North. The diversity of the types propagated in these experiments indicates that the results are applicable to a great many commercial forms.

MAKING AND SETTING THE CUTTINGS

In 1939, all cuttings were taken, between July 5 and 20, from the young, slightly succulent growth of the current season at the tips of branches. They were trimmed to lengths of about five to six centimeters. Leaves were removed only from the basal portion inserted in the rooting medium.

When the cuttings were set, the necessary sash were removed and the cuttings were inserted in the conventional manner, in small trenches cut with a large sharpened wooden label. A six inch board constituted a moveable foot path, avoiding tramping of the rooting medium. The cuttings were watered freely to settle them firmly and sash and shade were both replaced as soon as possible. Avoidance of undue wilting and drying out at this stage is

*Stoutemyer, V. T. The use of simple outdoor frames for rooting of summer cuttings. *Nat. Hort. Mag.* Vol. 20: pp. 208. 1941.

important. A slight wilting of the cuttings may occur during the hottest portion of the day during the first week, but if the frames are closed tightly, the cuttings will become turgid each night and suffer no permanent damage.

No ventilation was given until after the cuttings had rooted heavily, which was after six to eight weeks. In early fall, air was admitted to harden the cuttings before the advent of cold weather. The frames were watered as required according to weather conditions. At first, several waterings weekly were necessary, but later one every five or ten days sufficed.

Many of the cuttings inserted in July and August produced several inches of new shoot growth before autumn, particularly those cuttings treated with growth substances. With the approach of winter, ventilation ceased and the sash were kept over the frames during the winter. The lath shades were never lifted from the sash. In the vicinity of Washington, D. C., this was adequate protection for the majority of the varieties, but the terminal buds of the cuttings from certain crosses were injured and the bark cracked below them. The winter of 1939-40 was relatively cold for the locality and some mulching or other protection to the frames would have been advantageous to certain lots of the more tender sorts. The losses were not large in any case, however, and usually the tops of the cuttings grew again from buds below the terminal. Treatments with growth substances did not influence hardiness adversely. None of the crosses involving *Rhododendron obtusum* Kaempferi Wils. showed winter injury, although in many cases the other parent is of partial hardiness. The moisture in the rooting medium was checked at intervals during the winter, but watering was rarely needed.

THE USE OF PLANT GROWTH SUBSTANCES

In recent years several synthetic chemicals have been introduced into common use as a means of promoting better rooting of cuttings. These are applied to the cuttings in various ways, including soaking the bases in dilute solutions or applying mixtures of the growth substances in talc to the bases of the cuttings. Indolebutyric acid is the best known and most generally useful of these substances, and is designated in the accompanying tables as IB. Another widely used growth substance is naphthylacetamide, designated as NAD. In these trials, applications were made in talc dust mixtures, which is the form most favored at present. The concentration was usually 4 milligrams of growth substance per gram of talc, although stronger mixtures up to 12 milligrams per gram of talc were also tried to a lesser extent.

Experiments of several workers have demonstrated the value of growth substances when used on cuttings of azaleas, but these experiments were conducted in a propagating greenhouse rather than in an outdoor frame. Virtually no information regarding the value of growth substances for frame propagation is available, and a consideration of the responses measurable after a relatively long period in the frames seems advisable.

TYPES OF RESPONSES TO GROWTH SUBSTANCES

The growth substances produced several different responses which occurred both singly and in various combinations. The semi-deciduous azaleas became decidedly more evergreen. Typical examples are shown in Figs. 1 and 2. In many cases considerable shoot growth took place, as may be seen in Fig. 3. The size of the root systems

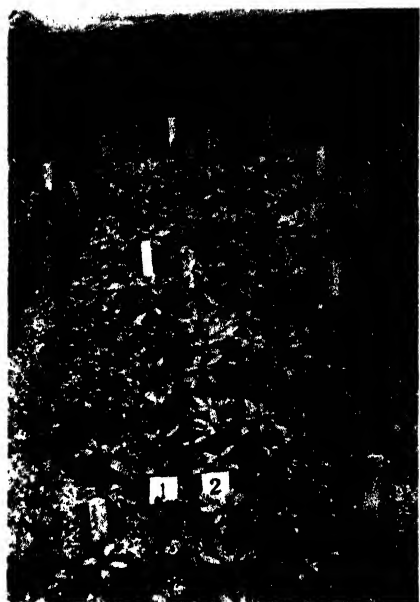


Fig. 1 (No. 76,093). *Appearance of cuttings in frame on March 1. Cuttings in row 1 were untreated, but those of same clone in row 2 were treated with a mixture of 4 milligrams indolebutyric acid per gram of talc.*

was often increased by the treatment with growth substances. A good example of the increase in heaviness of the root systems is shown in Fig. 4. In still other cases the percentage of rooting was increased, although the excellent rooting of the control lots of most of the varieties did not leave much room for improvement in this respect. The greater vigor of treated cuttings left little doubt of the value of growth substances.

VARIETAL DIFFERENCES

Varietal differences caused a striking diversity in the responses to growth substances; for this reason, any attempt to fix an accurate optimal treatment for these azaleas must be based on a par-

ticular clonal variety and on standardized propagating conditions. The genetic factors which influence ease or difficulty of rooting in azaleas have not been studied, but apparently they segregate freely in crosses. Thus cuttings taken from plants grown from seed from the same seed pod often showed great diversity of behavior. For instance, cuttings were taken from three sister seedlings of a cross of *Vittata Fortunei* \times *Miyagimo* may be mentioned. Some of the cuttings of these three selections were left untreated and part were dusted with a mixture of one part of naphthylacetamide to 250 parts of talc by weight. In cuttings from one of the plants no improvement in either the roots or tops was observable. Cuttings from a second selection responded to the treatment largely by a marked increase in the development of foliage of the tops, while the application of the growth substances to cuttings of a third plant resulted in a much heavier development of both roots and tops.

INFLUENCE OF THE ROOTING MEDIUM

Rooting was excellent in sand alone, but the foliage was retained on the cuttings much better during the winter in the peat and sand rooting medium. One other advantage in itself justifies use of the sand and peat mixture, however; namely, when the cuttings are removed from the frame, the sand and peat holds together in a ball which is easily handled in transplanting or potting, and there is less shock at transplanting to the usual soil mixture.

The addition of peat to a sand rooting medium modifies the response to growth substances, giving the effect of an increased concentration. This important fact has not been emphasized sufficiently in connection with the use of growth substances. Often a treatment which is highly effective and safe

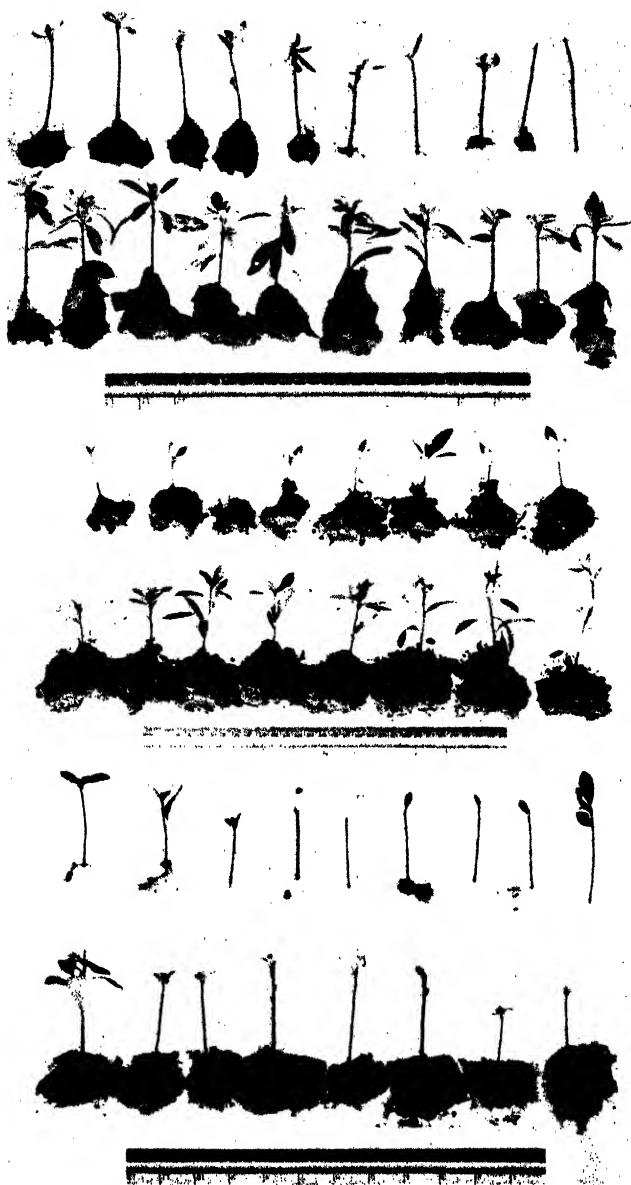


Fig. 2 (No. 76,115). Above: Cuttings untreated. Below: Cuttings treated with a mixture of 4 milligrams naphthylacetamide per gram of talc causing increased retention of foliage over the winter.

Fig. 3 (No. 76,080). Above: Cuttings untreated. Below: Cuttings treated with a mixture of 4 milligrams of indolebutyric acid per gram of talc producing increased growth of shoots in length.

Fig. 4 (No. 76,133). Above: Cuttings untreated. Below: Cuttings treated with a mixture of 4 milligrams of indolebutyric acid per gram of talc causing the production of heavier roots.

when used with pure sand is injurious when used with a peat and sand mixture. Conversely a treatment which may be effective in a sand and peat rooting medium may have less value with sand. Therefore the composition of the rooting medium must be stated in recommendations for the use of growth substances.

REMOVAL OF CUTTINGS

The cuttings were removed in late March of the following year, and transplanted to other outdoor frames with wider spacing or were placed in flats in benches in a cool greenhouse and were moved to a lath house later.

The records taken at this time permitted an evaluation of the influences operating during the period of rooting. Table I summarizes the responses of the clones to various treatments and rooting media. Since cutting material was not abundant enough to permit a clone to be tested under many different conditions, the comparisons in this table merely show trends in behavior. This table indicates the number of clones showing a definitely beneficial response after treatment with growth substance and those in which the re-

The cuttings in the various treatments were graded and separated into various arbitrary classes based on the rooting responses. "Heavy roots" indicates cuttings producing exceptionally large masses of roots forming a ball larger than one and one-half inches in diameter. "Light roots" indicates cuttings with sparse roots not formed in a definite ball. The intermediate class is designated as having "medium roots." All of the cuttings in this group had excellent root systems which would be considered more than adequate for satisfactory growth. These data are shown in Table II.

Since the percentages of rooting were rather high in the untreated lots, the treatments given could not cause large increases in the survival of cuttings, but they usually produced heavier rooting.

SHOOT ELONGATION DUE TO TREATMENT WITH GROWTH SUBSTANCE

One of the most striking effects of the use of growth substances on azalea cuttings was the increased growth of shoots of the treated cuttings following rooting. In order to measure this response, the numerically larger lots of cuttings treated with a dust composed

TABLE I.—RESPONSE OF CLONES TO TREATMENT WITH GROWTH SUBSTANCES

Treatment	Amount per gram of talc	Rooting Medium	Clones Benefited (No.)	Clones Not Benefited (No.)
IB	4 mg/g	Sand	134	60
IB	4 mg/g	Sand & Peat	42	1
NAD	4 mg/g	Sand	13	2
NAD	10 mg/g	Sand	16	5

sponse was questionable or absent.

Although these lots are not strictly comparable because of genetic differences between the various clones, these results suggest that the sand and peat mixture was superior to sand alone and that the peat, either because of some chemical or physical characteristics, aided the action of the growth substance.

of four milligrams of indolebutyric acid per gram of talc were selected at random and measured. Similar measurements were made on the untreated cuttings taken from the same parent plants. In 34 paired lots, each from an individual plant, placed in a rooting medium of mixed peat and sand, the mean length of the untreated cuttings was 6.6 centimeters. The treatment

with growth substance caused an average increase of $2.06 \pm .79$ centimeters at the time the cuttings were removed from the frame. Since each treated lot of cuttings was paired with an untreated lot from the same plant, Student's method of testing significance may be

used. In this test, $t = \frac{2.06}{0.79} = 2.60$.

This value of t was significant at the 5 per cent level and was just short of the 1 per cent level of probability. We thus have a reasonable assurance that the differences in growth were due to treatment and not to chance variation.

Measurements were made on 72 typical plants grown from treated and untreated cuttings, arranged in groups after removal from the rooting medium. These were grown in a lath house in a mixture of two parts of leaf mold to

tusum Kaempferi as one parent, a form which is often somewhat difficult to root particularly when the new shoot growth starts to harden. In no case did the influence of this parent cause any difficulty in rooting of cuttings of its offspring.

RESULTS OF EXPERIMENTS WITH CUTTINGS IN 1940

To determine whether the experience gained in 1939 would hold in another season, the studies with many of the same selections were continued during the summer of 1940. The cuttings were placed in both the sand rooting medium and in sand and peat in all those instances where the quantities of cuttings from a clone were adequate for comparison. The same growth substances used in the previous year were tried, but in addition to the concentration of four milligrams of growth substance

TABLE II.—PERCENTAGES OF AZALEA CUTTINGS ROOTING UNDER VARIOUS TREATMENTS

Rooting Medium	Treatment	Number of Cuttings	Rooting Response of Cuttings in Percentages				
			Total Rooted	Heavy	Medium	Light	Alive but Unrooted
Sand	Control	2,614	91.7	10.4	63.0	18.3	4.7
Sand	IB 4 mg/g	4,070	96.7	25.7	65.0	6.0	1.7
Sand	Control	259	94.2	9.3	73.0	12.0	4.2
Sand	NAD 4 mg/g	373	97.6	22.5	71.3	3.8	2.2
Sand	Control	229	94.8	23.1	60.3	11.4	5.2
Sand	NAD 10 mg/g	395	96.2	44.0	47.6	4.6	1.8
Sand & Peat	Control	546	98.5	26.7	61.4	10.4	1.3
Sand & Peat	IB 4 mg/g	1,160	99.2	59.3	34.6	5.3	0.3

one of sand. By mid-summer, plants from treated cuttings had produced nearly 50 per cent more shoots per plant, while the total length of shoots had almost doubled. Figures 5 and 6 show the typical growth produced by June 28 by cuttings removed from the frame and planted in a flat on March 28.

ROOTING OF CROSSES WITH R. OBTUSUM KAEMPFERI

Observations were made on cuttings taken from 35 different clones resulting from crosses having *Rhododendron ob-*

per gram of talc, mixtures of twelve milligrams were included in these trials. In most cases, twenty cuttings per lot were used.

The combined averages of rooting for all of the cuttings are shown in Table III, which includes results with forty-one clones. Since paucity of cuttings precluded giving all of the treatments to each clone, and since the various clones respond differently, the data may not be used for quantitative comparisons between the various treatments. Nevertheless, some important trends

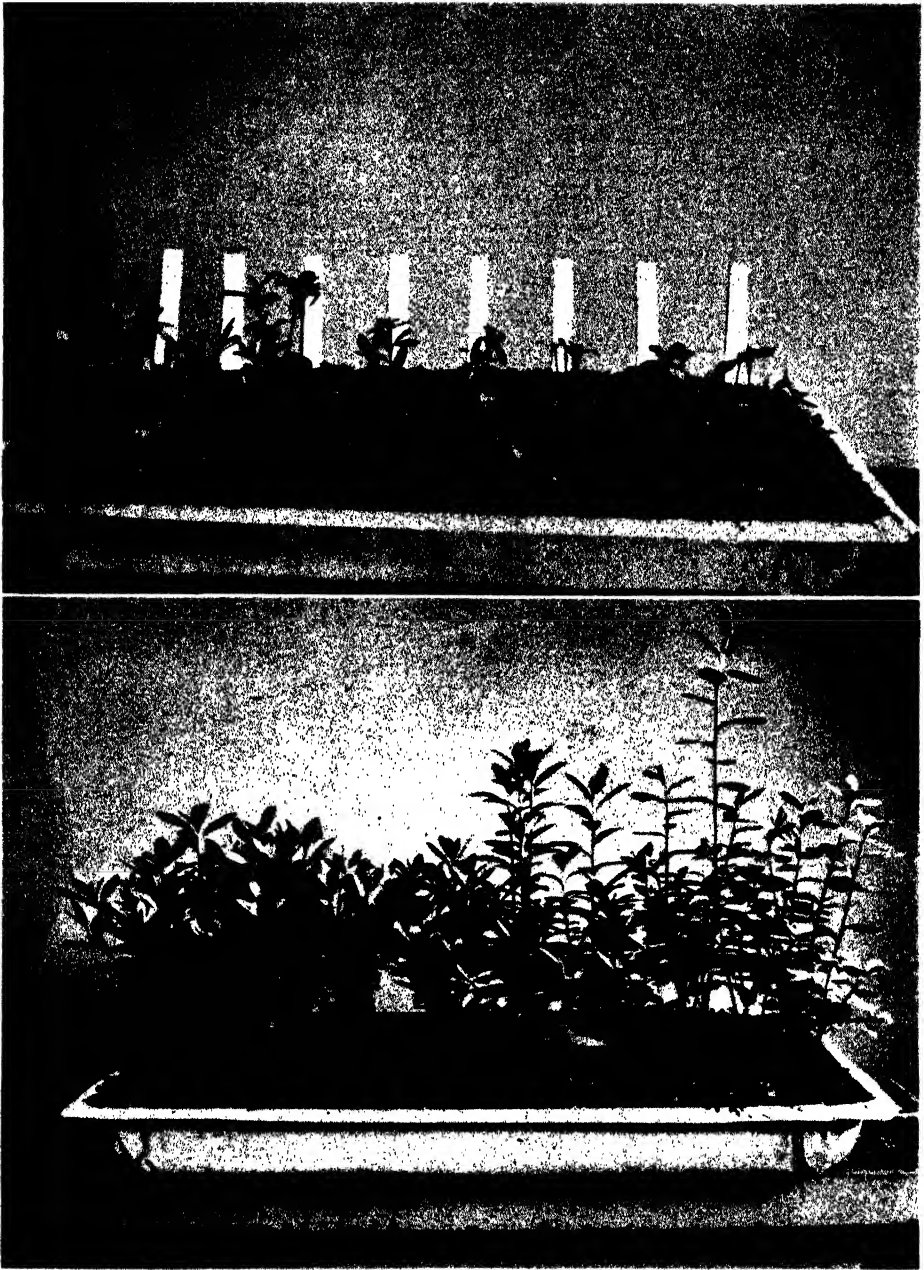


Fig. 5 (No. 76,155). *Treated and untreated cuttings planted in alternate rows in flat of leaf mold and sand in greenhouse on March 28.*

Fig. 6 (No. 77,635). *Shoot growth produced by cuttings after three months in flat. Started in greenhouse on March 28 and moved to lath shed.*

are shown clearly. The rooting was generally heavier with the peat as might be expected. Talc applied to the bases of the cuttings increased rooting in the sand medium but not in the peat and sand mixture. Indolebutyric acid increased both the percentage of rooting and the heaviness in both media. In one instance the results are at variance with those secured the previous year. Application of a mixture of four milligrams of naphthylacetamide per gram of talc produced no injury in 1939, while in 1940 this mixture was unmistakably injurious to cuttings of many of the clones in both rooting media. The cuttings were made on practically the same dates in both years. Apparently, the naphthalene growth

main constant from year to year. For this reason, except possibly with cuttings which root with unusual difficulty, the concentrations should be kept near the lowest which produce satisfactory results.

The response of cuttings to various concentrations of growth substances also depends on the environmental conditions of the parent plant. As a rule, we may state that any factor of growth which produces a more succulent growth reduces the dosage requirement. This is illustrated in experiences with cuttings of the variety, *Indica Alba*, properly *R. mucronatum* G. Don, made on June 26 and removed on August 5. These cuttings were taken from two stock plants growing in closely adjacent

TABLE III.—ROOTING OF CUTTINGS OF AZALEAS UNDER VARIOUS TREATMENTS

Rooting Medium	Treatment	Number of Cuttings	Total Rooted	Rooting Response of Cuttings in Percentages				
				Heavy	Medium	Light	Alive but Unrooted	Dead
Sand	Control	608	61.1	8.4	30.3	22.4	32.7	6.2
Sand	Talc	230	82.6	17.8	48.7	16.1	10.4	7.0
Sand	IB 4 mg/g	520	88.6	45.6	31.7	11.3	5.2	6.2
Sand	IB 12 mg/g	190	88.4	41.6	34.2	12.6	5.8	5.8
Sand	NAD 4 mg/g	137	57.0	9.5	33.6	13.9	15.3	27.7
Sand	NAD 12 mg/g	60	46.6	28.3	8.3	10.0	11.7	41.7
Sand & Peat	Control	351	91.4	41.3	43.3	6.6	4.6	4.0
Sand & Peat	Talc	150	88.6	36.7	44.7	7.2	2.7	8.7
Sand & Peat	IB 4 mg/g	301	97.0	79.0	13.0	5.0	2.7	0.3
Sand & Peat	IB 12 mg/g	88	88.7	75.0	5.0	8.7	1.3	10.0
Sand & Peat	NAD 4 mg/g	80	66.2	20.0	32.5	13.7	6.3	27.5
Sand & Peat	NAD 12 mg/g	60	65.0	43.3	10.0	11.7	5.0	30.0

stance is more toxic to azalea cuttings than the indole compound. Cuttings of various other species of outdoor plants taken during 1940 were unusually susceptible to injury by excess dosages of growth substance. Possibly some combination of growing conditions in the season of 1940 produced a more tender type of growth than in 1939. This experience demonstrates that the optimal treatment does not re-

situations, one of which had received frequent watering during the season, while the other grew without any artificial watering. Cuttings from the watered plant were injured severely at the bases by concentrations of growth substances which produced heavy rooting without the slightest injuries on cuttings taken from the unwatered plant.

As in 1939, only a few clones did not root well without the use of growth

substance of any kind. At the other extreme a few clones formed roots so readily that all treatments produced inconclusive results. The well known variety of Kurume azalea, Hinodegiri, is an example of a sort which rooted so readily that treatments with growth substance produced no benefits. With the majority of azaleas of types described here, the use of growth substances produced considerable increases in the heaviness of both roots and tops, which would be welcomed by the average propagator. The peat moss and sand rooting medium was superior for cuttings of all the azaleas tested.

Those who have empty greenhouses will find that they may be used advantageously for the rooting of cuttings of azaleas during the summer. If enclosed cases are not available, the cuttings may

be placed in open propagating beds, if the ventilation of the house is restricted. Moderately heavy shading should be applied to the glass. Light cheesecloth shade may be used over the cuttings if they appear to need further protection. The walks and benches should be sprinkled frequently to keep up the humidity within the greenhouse.

The outdoor frames require far less attention than a greenhouse and often produce superior results. Another advantage of the frames is that they provide a large amount of storage space for overwintering the cuttings and the operation of potting or transplanting is obviated during the same period. This method truly offers very nearly the ultimate in low cost production of these plants by vegetative means.

Crinum

FORMAN T. McLEAN
Oneco, Florida

GIANT relatives of the showy and popular amaryllis, the crinums are among the truly popular bulbs in tropical and warm temperate climates, where they will thrive outdoors. The flowers are neither so massive nor so brightly tinted as the amaryllis hybrids, but their profusion of tall, many-flowered umbels of fragrant flowers and their great masses of tropical foliage make them truly superb. Most of them are evergreen, so they do not leave the bare spots in the garden that many bulbous plants do. The largest growing crinums being the most popular in warm climates, and most abundant, they are apt to be the ones tried indoors in the North. When the purchaser of a crinum bulb receives one of these long-necked mammoths, six inches in diameter and about a foot long, he is apt to try to economize space by cramming it into an eight or ten inch pot, and then to expect it to behave like an amaryllis, sending up a proportionately huge flower spike directly out of the bulb, before the leaves develop. The hesitant and tardy pushing out of pale green stubs of leaves is accordingly a disappointment, and if the sprouting plant is not promptly given more commodious quarters, in a large tub fitting to its potential size, the venture is apt to soon terminate in failure and disappointment. Only a few of the smaller crinums are worth while to grow indoors in the North though the large ones will make a grand show, if given the space, warmth and sunlight they require.

The species most frequently seen in southern gardens, along the Gulf, in Florida and California and southward, are two of the real giants. The one most

often seen is *Crinum amabile*, with pink flowers, broadly striped livid red through the center of each recurving segment. The great clusters of dark green leaves, often rising three or four feet above the ground and having a spread about twice as great, is lifted a foot or more off the ground by the stout neck of the massive, half-buried bulb. The crimson-purple flower stalk arises from the neck of the bulb at one side of the cluster of leaves, and arches up through them, to lift the giant umbel of flowers well above the foliage. It is at first topped by a large crimson sheath, which bursts and folds back with the opening of the first bloom. After a day or two of warm weather, the full head of eight to a dozen large spidery flowers will be open at once, and will scent the air of the whole garden with their heavy perfume. As the flowers age, the stalk is apt to fall over and lie on the ground, unless held up by a stake or a hoop around the plant. Plants of *amabile* are apt to be seen as single specimens in the lawn or in rows of such single specimens along paths or fence lines. There may be diminutive offshoots at the base, but these seem seldom to reach much size, unless detached and given space to develop alone.

Second in popularity to *amabile* is the feathery white flowered *Crinum asiaticum*, likewise from tropical Asia. It forms massive clumps of several closely crowded plants, each consisting of a cylindrical bulb, rising a foot or two above the ground, and topped by a cluster of long, broad, wavy pale green leaves. From among these masses of lush foliage there arise at intervals throughout the year, stout green flower



Crinum asiaticum (upper)

Crinum amabile (lower)

stalks, each topped by a cluster of very narrow petalled white flowers with pale yellow anthers. They more resemble the blooms of a *Hymenocallis* or an *Ismene* than a *Crinum*, and their lemon perfume is milder and less oppressive than that of *amabile*. The plants increase rapidly by division, each usually dividing into two annually; and they

also seed freely. Though they resent cold and frost, both *amabile* and *asiaticum* will flower quite well in winter, in mild climates.

Some of the smaller, less imposing crinums may prove more widely useful than these giants. *Crinum zeylanicum* (often miscalled *C. Kirkii*) is a shorter and paler colored edition of *amabile*,



Crinum × *Louis Bosanquet* (left)

Crinum Kirkii (?) (right)

the bulb having only a short neck, barely lifting the leaves off the ground, and the large cluster of flowers, on relatively short stalks, are pale pink with deeper pink central stripes and have a strong, refreshing perfume. Its foliage will spread three to five feet, so it needs space, as do most of the crinums. *Crinum fimbriatum*, the milk and wine lily, is a still smaller, more graceful plant from Guiana, the carmine central stripes of the flower segments contrasting with the white ground color. The hybrid *Crinum virgineum*, with its large rose-pink tinted white flowers is another recurved-flowered sort of moderate stature.

Many of the crinums have entirely different flowers, broad petalled trumpets like lilies, or drooping open bells. These include some of the finest white and pale pink sorts. *Crinum giganteum* is a swamp lily of South Africa, and is a fine plant for moist, shaded stream banks, lifting its clusters of drooping white bells from a stemless clump of broad, lanceolate leaves in late fall or early winter, and often blooming

again in early summer. Its spicy-scented, large blooms are greenish on the outside, nearly pure white within, and are graceful and interesting rather than gigantic. *Crinum campanulatum* has small clumps of greyish green leaves, and three-inch bell shaped white flowers, striped deep pink. There are many trumpet-shaped hybrid crinums also, in white and light pink colors. Pale pink Louis Bosanquet, deeper pink J. C. Harvey, and deep shell pink Ellen Bosanquet are all dainty flowers. But the finest of the lot is probably *Crinum Powellii*, a pink or white flowered hybrid between the South African *C. Moorei* and *C. longiflorum*. Both parents are nearly hardy in temperate climates with moderate mulching, and the hybrid seems still more amenable to outdoor culture in the North. Its long-necked bulbs may be sunk 2½ or 3 feet in well drained soil, covered in winter with a deep mulch to keep out frost, and had to bloom in midsummer as far North as New York or New Jersey.

Primula Malacoides

W. C. BLASDALE

THE extraordinary wealth of Yunnan, the southwestern province of China, in species of *Primula* of unusual horticultural merit, began to be made known to the western world toward the end of the nineteenth century. About 1883 M. l'Abbe Delavay, a missionary of the Catholic faith stationed in Indo-China, who had acquired an interest in plants, made his way into virgin territory by following up the great canyon of the Mekong to the Tali Valley, located in the southern part of the province on a 6,000 foot plateau, which includes a great lake and an important city of the same name. His collections made in this region were sent to Professor Franchet of Paris, who found them to contain twenty-nine new *Primulas*, which he named and described.

Among these species Franchet recognized one which resembled in its habit of growth a European plant known as *Erodium malacoides* and, presumably sorely pressed to find names for so many new species, he named and published this one in 1886 as *Primula malacoides*. It is to be regretted that so charming a plant has been burdened with so cumbersome a name, which gives no suggestion of the peculiarities with which it is associated save possibly to those which are familiar with the little-known species of *Erodium*.

Seeds of *P. malacoides* collected by Delavay and sent to France failed to germinate, and it was not until 1908 that a second collection, made by George Forrest for the firm of A. K. Bulley, reached England. From these, flowering plants were readily grown and the seed from them widely distributed. Forrest found the species in abundance in cultivated fields and waste places, even within the walls of

the city of Tali. Later collectors have shown that it is rather widely distributed and appears, in a number of forms, in the valley of the Yangtse and as far west as Eastern Burma.

The effect of cultivation on this species has been phenomenal as to changes in its habit of growth, in the form, size, and color of the flowers, and in the rapidity with which these changes have been brought about. This is to be attributed in part to the ease and speed with which it can be brought to the flowering stage and in part to a certain predisposition to undergo variation under cultivation. Within a few years of its introduction notes describing and picturing improvement in its attractiveness began to appear in British horticultural magazines. Some of these improvements were achieved by amateurs; more by systematically planned experiments of such firms as Sutton and Sons and Carter Brothers, which are still being continued. On the continent similar work was carried on by Vilmorin of Paris and later by state-supported institutes at Oranienburg and Weißenstephan near Munich and Wädenswil near Zurich. The results of the activities of these agencies became known through the series of named varieties or strains which they put on the market, but only the last named published a detailed statement of the procedures used, which involved growing 40,000 plants. It is a very important contribution to both the practice and theory of plant breeding.

By 1918 English breeders had developed many varieties of real merit and had shown the latent potentialities of the species. On the continent serious experimentation, based on the results of English breeders did not begin un-

til about 1925, largely as a result of a desire to find an acceptable substitute for *Primula obconica*, whose rash-engendering properties had threatened legislation against its sale in both Holland and Germany. Incidentally it should be noted that the discomfort arising from the cultivation of *Primula obconica* has been greatly exaggerated; in spite of inquiries extending over many years I have learned of only one individual who suffered from it, although it is one of the most popular house plants in California. An unexpected and gratifying by-product of the campaign against it has been the perfection of a second species which is fully its equal in beauty and variability and is even more easily grown.

The English, German, and Swiss breeders have had slightly different ideals in mind and, working independently, have created new strains, which, though concerned with essentially the same variants, have given to their respective productions certain peculiarities which often betray their origin. Many of these strains lack stability, and growers of them find no difficulty in selecting plants which seem to possess, sometimes as the result of wishful thinking, superior features and though the improvement may be a slight one the temptation to put them on the market under a new name is hard to resist. As a result we have a truly formidable list of varieties, few of which have been adequately described and most of which rapidly disappear from trade lists.

A bird's-eye view of the varieties of *Primula malacoides* now available can be attained most easily by taking up in succession the nature and order of development of the six major groups of characters which enter into their composition. I regret that my experience in growing them has been too limited to deal with the subject to my entire satisfaction.

The original species is distinguished by a crown of leaves, most of which are held erect or ascending, up to the time at which the flower begins to wither. Each leaf consists of an ovate-oblong blade, which is slightly lobed and toothed, sustained by a petiole of about twice its length. During the earlier years cultivation had but little effect except an increase in the size and cordateness of the blade and the English breeders gave little attention to the foliage features. With the great increase in the abundance and size of the flowers it began to be recognized, especially on the continent, that the foliage was no longer adequate for a proper balance between the two and, especially at Wädenswil, strains with longer petioles and more perfectly formed blades were emphasized. A more distinctive feature, developed at the same institution, was the perfection of a "gracilis" strain in which the single crown was split up into a number of closely associated crowns, yielding a larger mass of foliage associated with many scapes of moderate size whose flowers opened more nearly at the same time.

A more deep-seated change arose about 1924 in the "gigantea" type. In it the blades are larger, rounded rather than ovate, only slightly longer than broad, clearly cordate and somewhat undulate, and the petioles are decidedly shorter. Further, the leaves were fewer and held more nearly horizontal, forming a rosette-like crown. Fig. 1 illustrates these differences. Accompanying this type of gigantea foliage are more sturdy scapes, larger flowers, and an increase in the size of the seeds and the pollen grains. These peculiarities are associated with the phenomena of "tetraploidy," that is an increase in the number of chromosomes from 18 (diploid) to 36 (tetraploid). It is now evident that gigantea forms arise in nearly all strains as the result of cultivation



Fig. 1. The six-inch pot on the left contains plants of the small-leaved variety, *Fairie Jewel*; that on the right of the gigantea-leaved variety, *Peter Pan*. Both pots were planted on the same date, given identical treatment and photographed 58 days after sowing the seed.

in an overall average ratio of about one plant out of 200. Although somewhat unstable they are peculiar to many standard varieties such as Sutton's Dwarf Eclipse (1926) and Carter's Peter Pan (1939).

In the original species the scapes arise very early in the development of seedling plants; they reach a height of from six to fourteen inches and are so weak that only mutual support prevents many of them from falling over. Continued cultivation has delayed the appearance of the scapes, reduced their number per crown to a half or a third but increased their thickness by the factor two or three. This process began as early as 1912; its progress is shown in such varieties as Rose Queen (Dennison, 1912), Princess Mary (Carter, 1928), Duchess of Kent (Carter, 1936). Associated changes were decided decreases in the length of the scape and contraction of the distances

between the successive whorls. Further differences have arisen in the lengths of the pedicels which support the individual flowers, usually in the direction of greater uniformity in the lengths of the pedicels of the different whorls, resulting in a compact cylindrical rather than a pyramidal inflorescence. These changes, in their extreme form yield so-called "dwarfs," which the uninitiated would find it difficult to associate with the name *Primula malacoides*.

The native species bears regular flowers in which the flattened corolla-limb is divided almost to its point of attachment with the corolla-tube, into five wedge-shaped segments whose edges are separated by an appreciable interval whose two corners are but slightly rounded off, and whose upper edges are clearly cleft at the centers. The net result is a pattern (See Fig. 2) suggesting that of a rose window. The first effects of cultivation were to

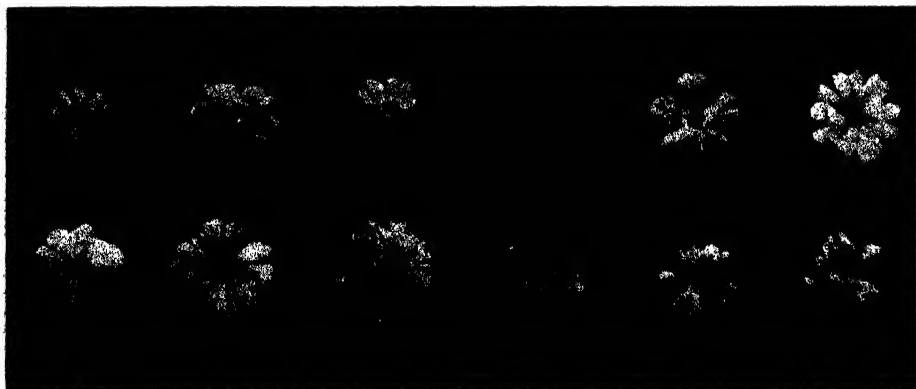


Fig. 2. Illustrating differences in the size and form of the corolla of different varieties. Upper row from left to right (1) original species, (0.5 in. in diameter), (2) *Princess Mary*, (3) *Atropurpurea* (just opened), (4) *Atropurpurea* (several days after opening), (5) *Baby Rose*, (6) *Snowflake*. Lower row from left to right (1) unknown variety, (2) *True Rose* (fimbriated), (3) *Peter Pan* (with overlapping segments), (4) *Peter Pan* (with crinkled edge), (5) *Roselle* (with hose-in-hose doubling), (6) *Roselle* (with normal doubling).

broaden the segments until most of the gaps between them were closed and to round off the corners still more, imparting to the corolla a star-shaped pattern, although each of the five points are bifid and their sides curved. An additional increase in the width of the corolla segments caused them to overlap yielding a disk-like or wheel-like pattern with sometimes a suggestion of doubling.

Another change which began to appear about 1924 was a slight and irregular indentation of the corolla edge, sometimes developing into a lace-like rim on its periphery, a change usually associated with the term "fimbriation," often an attractive feature. In this species it is associated with a similar change in the lobes of the calyx. Occasionally also the edge of the corolla is slightly crinkled.

Finally, the process of doubling began to appear as early as 1912 and by 1919 double forms of white, lilac, and mauve varieties (W. and J. Brown) were available. As in the Chinese prim-

rose doubling is due to the development of outgrowths from the connective tissue at the tips of the anthers. In the initial stage it yields only a narrow fragment of a new petal which stands erect. In the more perfected stage these fragments are more numerous, larger, ascending rather than erect; in still other forms they produce a nearly perfect second corolla, parallel to the first and yielding a hose-in-hose effect.

Franchet's description gives the size of the flowers as ten to twelve millimeters, that is, about half an inch. Through cultivation flowers of double this size were soon produced and many of the modern varieties yield flowers 1.25 inch in diameter. More detailed information as to form and size of modern varieties is presented in Fig. 2.

The color of the original species is described in terms of a variety of shades and varies in nature. In all of them a pink rather than a lavender element predominates and cultivation has intensified the red rather than the blue component. White forms, which occur in



Fig. 3. *Variety True Rose*.— Two plants, just beginning to flower, in a six-inch pot.

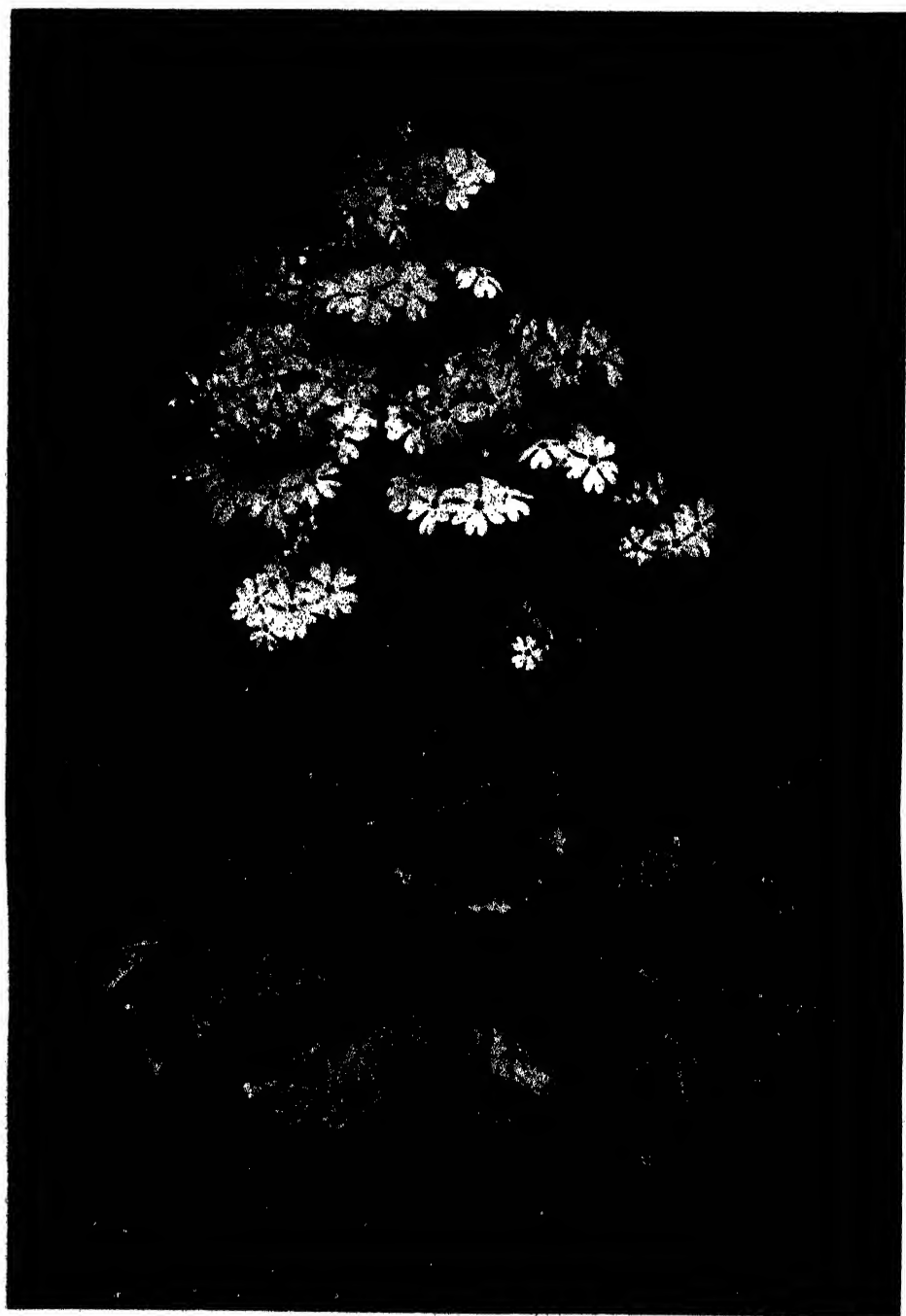


Fig. 4. *Variety Baby Rose. One plant in a five-inch pot.*

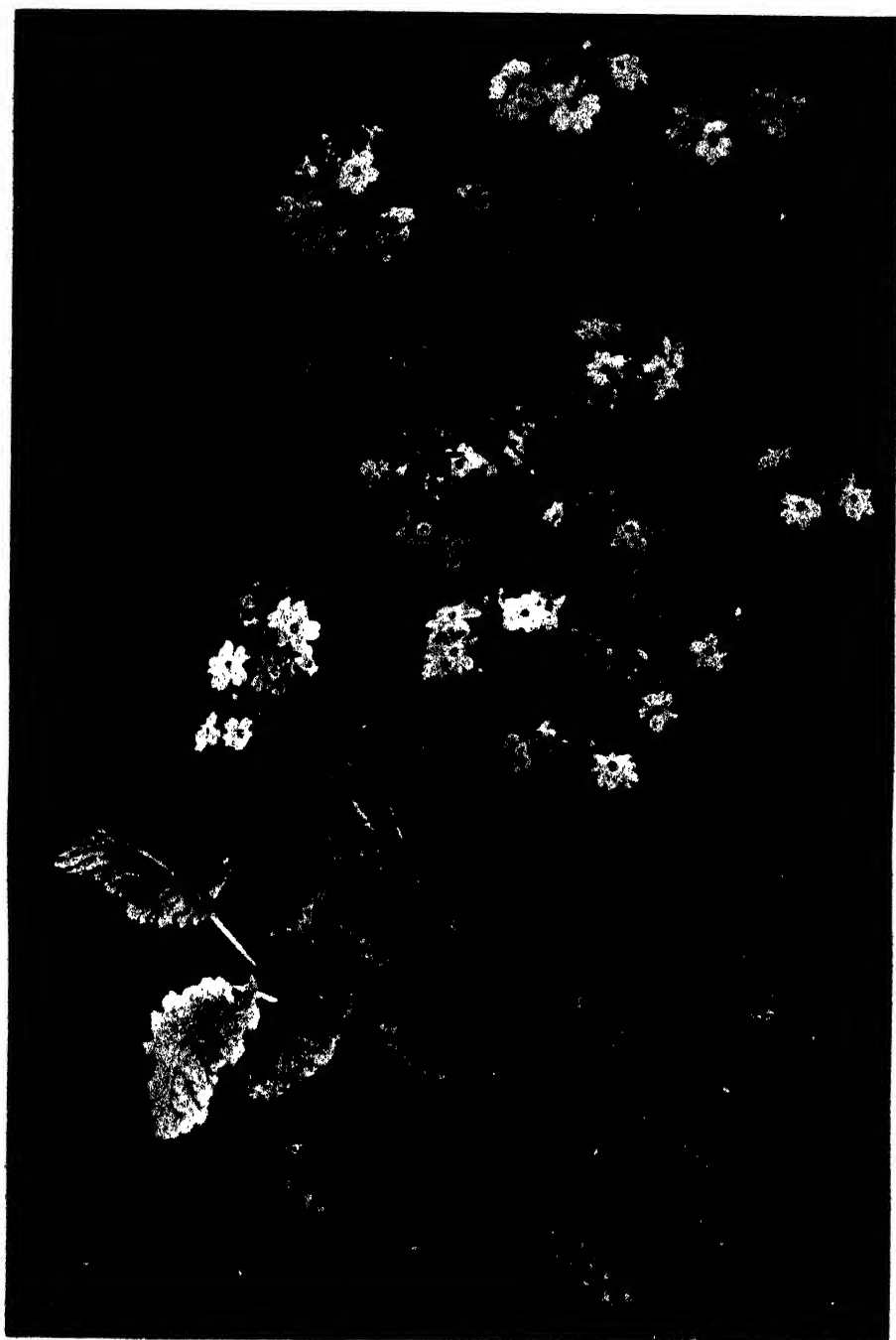


Fig. 5. *Variety Atropurpurea*. Two plants in a five-inch pot.

nature, appeared in 1912 (Sutton), a deep pink in 1914 (James Box), a rose in 1915 (Rose Queen of Dennison), and a lavender in 1917 (Sutton's Eclipse). Later the pink became a good carmine and almost crimson, sometimes with a tinge of salmon. Little success has attended the attempt to isolate and intensify the blue of the lavender varieties.

Normally a narrow and poorly defined band of a lighter color surrounds the corolla tube. With cultivation this became broader and began to acquire a yellow or greenish-yellow color. In time it became deep yellow or bronze and assumed the form of a clearly defined, five-pointed star, as in Carter's Golden Eye (1925) and the varieties Atrosanguinea and Radio.

In this, as in at least half of the species of *Primula*, a white powder is found on the under surfaces of the leaves, the calyx-lobes, and the upper portions of the scapes. This secretion is exuded by small gland-tipped hairs, and is composed of the substance known to chemists as flavone, associated with smaller amounts of wax-like substances. It has no function but adds appreciably to the attractiveness of the scapes and unopened buds. Cultivation has developed, on the one hand a few varieties, such as Atrosanguinea, in which farina is lacking, and on the other hand varieties in which the amount has been increased.

The items from the five sets of variables listed above may be associated in an almost infinite series of combinations, of which the named varieties now available are illustrations. The results already achieved by breeders indicate that new combinations of these items, representing desirable additions to our list of varieties, can be brought about. Further, we are here dealing with a species which has been stimulated to a point at which many mutations have

arisen and new ones, possessing still other desirable features, are to be anticipated. Hybridization with other species has had no part in the development of the varieties of *Primula malacoides*.

To those interested in the theory of plant breeding it might be of interest to state that the development of this ornamental presents no unusual features. Most of the changes brought about are due to somatic variations, that is to changes originating in the vegetative tissues of the species, which have been segregated and intensified by cultivation and selection. The gigantea forms, on the contrary, are the result of changes in the sex-cells. The change from diploid to tetraploid germ-cells is associated with easily recognizable changes in both the foliage and inflorescence. It should be noted however that the gigantea strains are more variable and less easily stabilized than the diploid forms.

I recall the thrill inspired by my first sight of a blooming plant of *Primula malacoides*. It was in Boston in the spring of 1914. During the course of the following season I experienced further satisfaction in discovering how easily it could be grown in an unheated greenhouse, and how readily it adapted itself to the winter and spring peculiarities of the California climate. This adaptability was soon recognized by florists in the central and southern parts of the State, and it is now accepted as one of our best winter-flowering bedding plants. A survey of seed catalogues, originating in many parts of the United States, indicates that it is widely grown, but apparently as a greenhouse rather than a bedding plant. Since I have known it to endure six degrees of frost for five successive nights without injury I am of the belief that it could be used more widely for out-of-door culture.

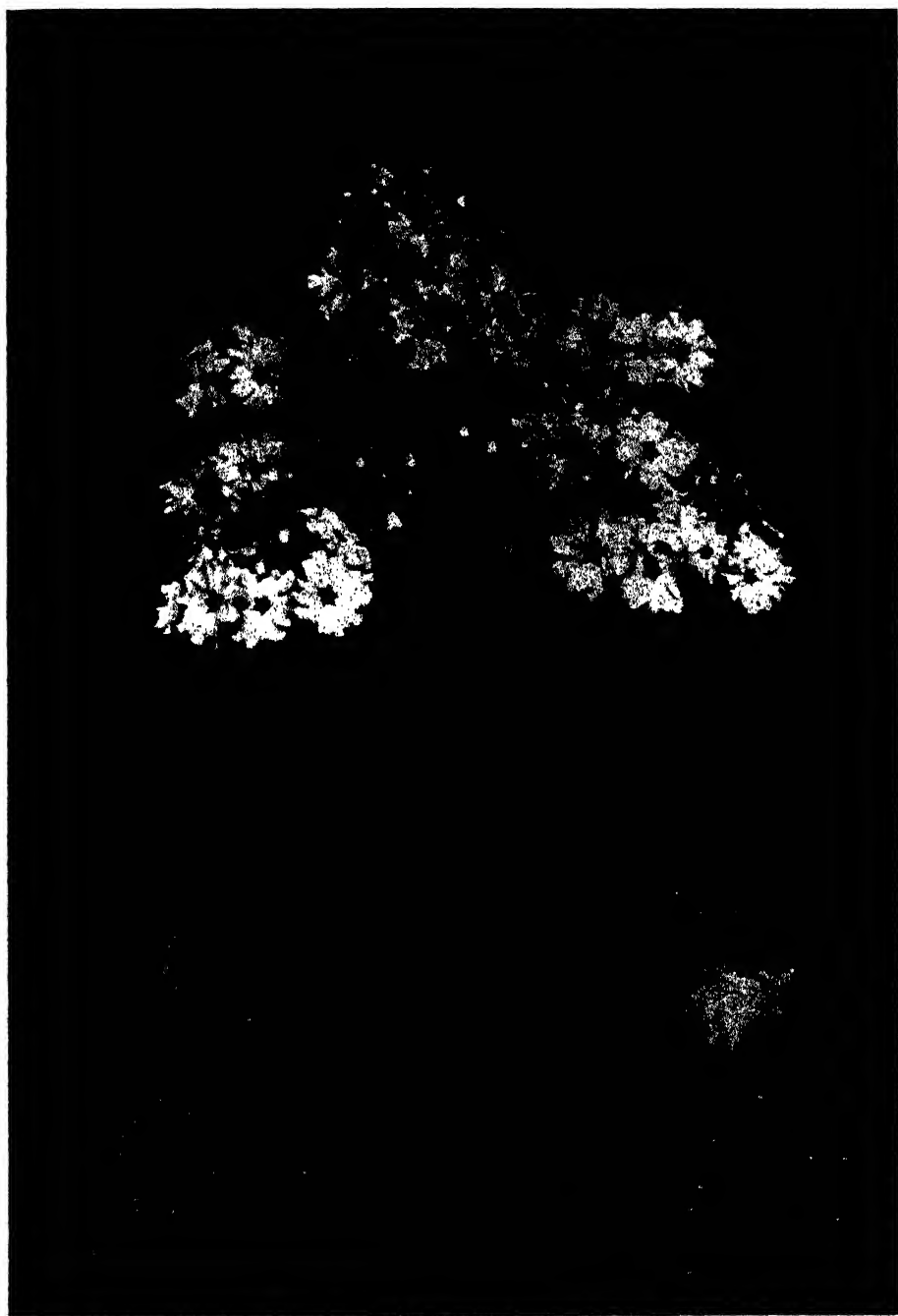


Fig. 6. *Variety, Peter Pan. One plant in a four-inch pot.*

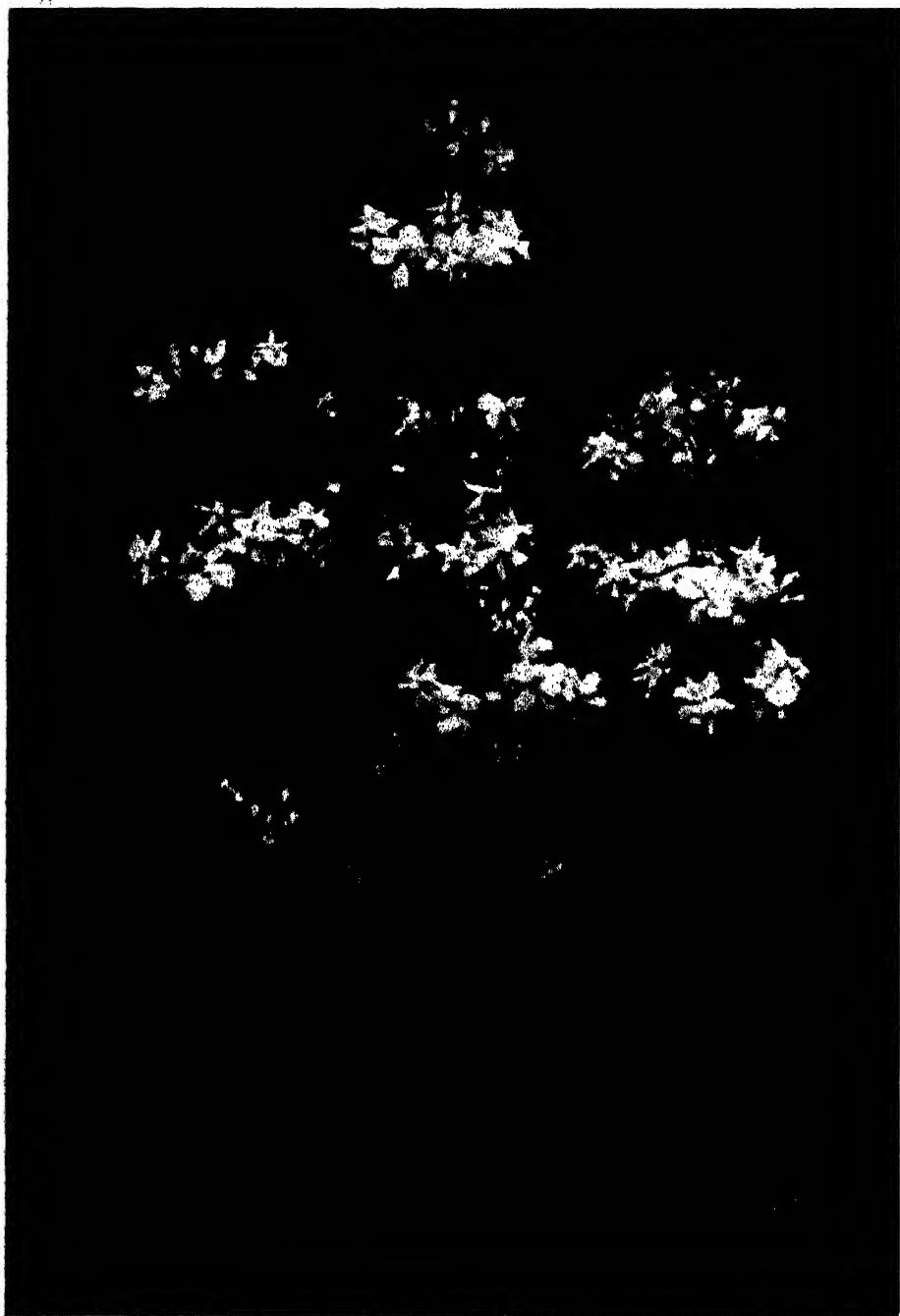


Fig. 7. *Variety, Roselle. One plant in a five-inch pot.*

The varieties of which seed and plants are most largely sold do not do full justice to the potentialities of the species. In this part of the State at least local florists can supply white or pink or lavender flowered plants but they know nothing of the finer named varieties. This is to be regretted even when they are to be grown in masses in the open border or beds; it is most unfortunate when specimen plants are the objective.

The ideal conditions for greenhouse culture are almost identical with those accorded *Primula obconica*, except that the necessary pre-flowering period can be shortened by four weeks. The essential qualifications are a daily average temperature not exceeding fifty degrees and the maintenance of a steady but not rapid rate of growth up to the flowering stage. These conditions should insure a crown of foliage large enough to fill a five-inch pot and a mass of flowers, whose beauty of form and brilliancy of color are fully the equal of *Primula obconica*. One should not expect to grow such plants out of doors, even under the favorable winter climate of California, unless some protection, especially against long continued rains, is provided. A frame which ensures plenty of light and air satisfies these requirements almost as well as a greenhouse. The accompanying photographs of plants representing five varieties were grown in a frame with a glass roof but only slightly protected on its sides by adjacent buildings. Fig. 3 represents two plants of True Rose in a six-inch pot just beginning to flower. The foliage is abundant, the scapes tall and very stout, and the deep

rose flowers of large size. Fig. 4 represents a single plant of Baby Rose in a five-inch pot. This variety is of the large crowned "gracilis" type, with an abundance of short scapes of deep pink, star-shaped flowers of moderate size. It begins to flower early and has a long blooming period. Fig. 5. My stock of this was derived from a florist who knew nothing of its name or origin, but its characters agree with those associated with the variety *Atropurpurea*. Its long scapes, star-shaped flowers with a conspicuous yellow eye suggest the variety Princess Mary. The pronounced change in the color of the flowers from deep pink to crimson, approaching maroon, is very distinctive. Fig. 6 represents a plant of Peter Pan in a four-inch pot, a dwarf variety although of the gigantea class. In this specimen the central three-whorled scape reaches a height of six inches; the large disk-shaped flowers are beautiful crimson pink with a light yellow eye. Plants grown from the same package of seed produced both longer and shorter scapes and fimbriated or crinkled corollas, whose color varied from crimson to pink. It is the most charming of all the varieties I have grown. Fig. 7 represents a plant whose seed was purchased under the name Roselle. I cannot see wherein it differs from the variety Fairie Jewel, and both are probably the same as the older variety Exquisite. The distinguishing feature is the double flowers which include rose pink shades of varying intensity, sometimes with a suggestion of a salmon tinge. It is one of the best of the double varieties, over which I am not especially enthusiastic.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

AMONG gardeners, both amateur and otherwise, one often hears comment regarding trueness to type of plants. Such comment is perhaps most frequent among those who are growing plants of the genus *Rhododendron* and arises, first, from the fact that none of us, in this country, are too familiar with the host of new forms we hear about and, secondly, because the plants themselves, for reasons which I shall cite, are prone to be variable anyway. Having mentioned this matter on numerous occasions, I realize that my present words may be repetitious, but the continued interest of growers seems to warrant reiteration. At the present moment I have on my desk three letters regarding this phenomenon, one asking about the status of the azalea known as "Louisa Hunnewell," another about the failure of *R. Albrechtii* seedlings to conform to descriptions in the literature, and a third regarding the behavior of certain characters in crosses of *R. Kaempferi*. All of these questions are related to the subject in hand, in one way or another.

Suppose you are raising seedlings of a Chinese species, and when these plants bloom they differ in color, hardness or some other quality from the official description in the botanical books. The first thing to do is to examine the source of seeds. If the seeds came directly from the wild station in China and were reliably labeled (which might not necessarily be the case), you can be fairly sure that the non-conforming seedlings are natural variants of the species; to be such, however, they must conform to the specific type in most respects and still be more like the given species than any other. If they depart too far away from the type

to be reasonable variations—and by this you will do well to measure the extent of variation among our common native species—then they should certainly not be called by the specific name, because they are not of that species, but are either hybrids or members of some other group instead. I do not know how often natural hybrids occur within the genus in China, but occasionally one pops up in this country among our native sorts, so I suspect that hybridity is not unknown among the wild plants of the genus throughout the world. In other genera wild hybrids sometimes occur in quantity, as, for instance, among the irises of the Mississippi delta, where what were first thought to be more than 60 new species turned out to be considerably less species, with a large preponderance of hybrid forms growing among them.

But your seeds may not have come from the wild at all. If coming from some English garden, or a commercial seed house, or having occurred among a collection of plants in an arboretum or any other place where different species are grown in neighboring situations, you have no assurance that your seeds are not the result of crosses between the mother plant and pollen brought to it from foreign species by the bees. Although not all the species will inter-cross, there is always danger of crossing whenever two or more kinds of rhododendrons or azaleas are blooming at the same time. In fact, many are unwilling to set seed to their own pollen and actually require the pollen of another individual plant, either of their own species or something else, in order to set seed at all. Although it is claimed by Rothschild

and other breeders that flowers, once hand-pollinated, need no protection because the stigmas are too covered by pollen to accept any more, I have made laboratory tests in which it has been well demonstrated that several kinds of pollen can act at one and the same time. Although I am willing to accept Rothschild's view for most practical purposes, I insist that a good deal of care is necessary, both before and after the act of hand-pollination, to prevent pollen-bearing insects from contaminating the unprotected flower with unwanted pollen of other sorts if any related species are in bloom at the same time. When I make pollinations, I choose to bag the flowers before the buds open, and keep them under bags until the petals fall and there is no possible danger of contamination. So much for seedlings of definite species which do not come true to type.

Now, as to the status of a plant like the azalea, "Louisa Hunnewell." I am asked if the arboreta and certain other reliable gardens do not have correctly labeled specimens of this plant. Here is its history, as nearly as I can obtain it: In 1913 Mr. T. D. Hatfield of the Hunnewell Estate, Wellesley, Mass., raised seedlings of a cross he made between the pure species *R. japonicum* and *R. molle*. Plants first flowered in 1917 and were named "Miss Louisa Hunnewell." Whether or not this name was applied to one particular plant or to the whole batch is not known by me. Perhaps this first batch of F_1 seedlings were remarkably uniform in character, as sometimes happens. In any event, some plants, at least, were excellent and deserving of a varietal name. Some years later Mr. Hatfield showed me an excellent example of the original cross, and this *individual* I would regard as an authentic "Louisa Hunnewell." The facts are, however, that seeds taken from the original plant

or plants were raised as "Louisa Hunnewell," and came to be disseminated, along with their seedling descendants, in the nursery trade under this name, in the same manner in which a true-breeding species might be multiplied by seed. Now the original plant, as I have said, was a hybrid, and the seedlings of the second and subsequent generations have exhibited all the variation of their hybrid origin, many being quite unlike the original "Louisa Hunnewell" that I saw. Not breeding true, the seedlings have no right to bear the varietal name. There is some evidence that these plants were, by certain authors, regarded as a "cultigen group" or race, to which the name "Louisa Hunnewell" was employed collectively. But, in my opinion, this was unjustified, since the plants were not sufficiently distinct from other *japonicum* \times *molle* hybrids (already identified as "Mollis Hybrids" and classed as a cultigen group under *R. Kosterianum*) to constitute a group by themselves. Hence, I would regard as authentic "Louisa Hunnewell" only one definite individual, of Hatfield's original F_1 production, and such of its offspring as have been produced by vegetative means, to wit: scions, grafts, layers or cuttings of the original plant, and not seedlings therefrom. Whether or not the original plant, or any of its vegetative progeny, are in existence, I do not know. If not, then the variety "Louisa Hunnewell," has passed into extinction so far as I am concerned, regardless of what the labels in the botanical gardens may say. In other words, I regard azalea "Louisa Hunnewell" as a clone, but its seedlings merely unnamed *japonicum* \times *molle* seedlings.

The same situation is doubtless true of certain hybrid groups in England, such as *R. kewense*, which have to be subdivided into clones in order to distinguish the varying individuals result-

ing from crosses between identical species. Variation of plants within a species is so great that when two species are crossed repeatedly, using different individuals within those species as parents, it does not follow that identical results can be expected. Indeed, there is every evidence that the use of carefully chosen individuals as parents is highly advantageous over run-of-the-mill breeding stock. While there is considerable advantage in having a good collective name to cover a group or race of distinct character and hybrid origin, such as the Ghent Hybrid azaleas or the Catawba rhododendrons, the narrowing down of a cultigen group to designate merely a few hybrid seedlings which do not breed true, as in the group of seedling azaleas popularly sold as "Louisa Hunnewell," is to be deplored, since the progeny does not retain the quality or character of the original nor does it constitute a new race. It is my conjecture that the custom of applying a single name to include several variant individuals of a given species cross has been considerably overworked in recent years by the British hybridists, and it is to be hoped that the practice will not extend further in this country.

Of course, there are other things beside race or variety which cause plants to vary in certain ways. So far as we can tell, the effect of ordinary environmental factors, such as soil, site and climate, does not produce permanent or heritable changes in the plant, although minor fluctuations in color, height or habit may be expected. For instance, the color of Camp's scarlet azalea which I collected on a Kentucky mountain-top, at 4,000 feet, is not the same brilliant shade of vermilion in my garden as in the higher altitude. Shade, soil and season sometimes alter flower colors considerably on given plants. But the effect is not permanent.

Treatment with X-ray or colchicine, on the other hand, will sometimes induce permanent genetic changes in plants, many of which, however, are of a degenerative nature and not horticulturally desirable.

Several well known species of azaleas are exceedingly variable in genetic character at all times. The so-called "Indian azaleas" of the greenhouse, are frequently producing somatic mutations, or "sports," in which one branch of a plant ordinarily pink will start producing red flowers, or vice-versa. Variegation versus solid color is another quite common character which appears unstable.

The Obtusum sub-series, to which these Indian azaleas and many other Japanese and Chinese azaleas belong, seem packed full of variation as well as hybridity, and have presented classification difficulties to the taxonomic botanists who have tried to straighten out the species. In several instances, notably the Yodogawa Azalea and *R. mucronatum* (the clone commonly called "Indica Alba"), forms which seem obviously to be artificial or unnatural have been doing duty as "type species." The lavman, therefore, should not be too willing to accept, as natural or "true breeding" races, all of the forms which have been set up as species by the botanists. For, while the latter have done their best to keep things straight, there are many discrepancies, particularly among those groups just alluded to, where classification is difficult, due to long years of cultivation with its accumulated cargo of hybridity and selective breeding.

Rhododendron Kaempferi, as has been noted before, is exceedingly variable by inherent nature. In many respects, it is so closely related to *R. obtusum* that no perceptible line of demarcation between the two species can be found. And yet, the extremes are



Claude Hope

[See page 212]

Rhododendron intricatum
(Natural size)

so great that *R. Kacmpferi* and *R. obtusum*, at opposite ends of the scale, seem to stand alone as distinctive species. Other related species, too, seem to grade into *R. Kaempferi*. Consequently, what the botanists say about these forms must necessarily be quite arbitrary. But this does not alter the

character of the plants or reduce their horticultural value. It merely emphasizes the importance of the individual, rather than the species, as the most horticulturally significant factor. In general, we hear too much about species of rhododendron and azalea, and not enough about certain noteworthy

individuals which occur within those species. This is particularly true of such groups as the azaleas of the *Obtusum* sub-series, in which individuals are easily multiplied by propagation from cuttings. But in most other groups of the genus *Rhododendron* which we grow in America, vegetative propagation is slow and difficult, while seedling production is satisfactory and exceedingly fascinating for amateurs. And, since seedlings are prone to be variable in character and often hybrid in origin, we may continue to expect a good deal of confusion in their classification. To assist in keeping the record straight, let us all be precise in our methods and our records, knowing the parentage of our seedlings and recognizing the fact that two parents, and not just one, is the usual rule and that the resulting progeny may resemble either or neither or both when hybridity is involved.

C. G. B.

The transmission of characters between *Rhododendron haematodes*, Franch; and *Rhododendron Fortunei*, Lindl.

An interesting life long study is opened to any person interested in the "transmission of characters" of the species and varieties of rhododendrons. All questions, doubts, and answers, in carefully conducted trustworthy investigations along the lines of hybridization, sterility, chromosomes, and genetics, are an advancement to science.

When it is considered that there are well over a thousand species of rhododendrons scattered throughout the continents of the world, from Asia, Europe, America, and even one in Australia, also that many of them, are being brought together on the Pacific Coast of America for the first time,

and that hybridization in its infancy has commenced, any discoveries along this line should be recorded for future generations. It is a well known fact on the American continent that the Pacific Coast area, near the 28-29 degree line, is "par excellence," for the growing of many more species and varieties of rhododendrons, than can be grown in the east, south, or west of this continent; owing to its milder climate, ranging on an average, minimum 25 degrees, F., to maximum 90 degrees, and with these extremes only for a day or so. The abundant rains (and sometimes snow), from October, November, to March, April, with a congenial winter climate, the partial shade or sun according to variety, and the landscape effect with a dark green background of this coniferous region, by a backing of conifers, or deciduous native flowering trees and shrubs, with its protective influences from strong winds, will eventually make this a New World mecca for rhododendrons.

In addition to this there are in some instances, areas of peat land in the Northwest, which, with some work, can be fully utilized in the growing of rhododendrons. Several excellent hybrids have arisen, some of which have received Awards of Merit, where the *Neriiflorum* series has been hybridized with some other good species. With these ideas in mind, the following paper is submitted of a genetical hybridization between a species, *R. haematodes*, that come from the province of Yunnan, China, which is near Burma, growing at an altitude of 11,000-12,000 ft.; and a species, *R. Fortunei*, from the province of Chekiang, China, and nearer to Japan, growing at an altitude of 3,000 ft. So that there is a distance of approximately one thousand miles between these 2 species in their natural habitat. The series and subseries involved in this fertilization are:

The characters of inheritance from one or the other parent are given. Only the characters showing wide deviation are included in the comparison, the many other characters of the 2 parents and its offspring differentiating to such a small degree that they are not given.

I assume that *R. haematodes* was the ♀, as it is the usual practice in scientific plant breeding to put the female first.

The analyst of

Rhododendron haematodes; ×

Rhododendron Fortunei.

Rhododendron haematodes, in its native habitat grows to a height of up to 10 ft., although the plant when cultivated is usually 3-4 ft. high.

Rhododendron Fortunei, in its habitat is usually a shrub of 10-12 ft. although some authorities give it as 15 to 20 feet. The hybrid plant is about 3 ft., but as it is a young plant no mature height at present can be given.

1. In the young shoots both parents transmitted their characters, but the glandular feature of *R. Fortunei* was predominant over the glandular character of *R. haematodes*.

2. The influence upon the size of the leaves show that the hybrid had the leaves intermediate between the parents.

3. The smoothness of the leaf beneath, of *R. Fortunei* was impressed, with the indumentum of *R. haematodes* suppressed, but in other characters it was not.

4. The influence of *R. Fortunei* in increasing the number of veins is well seen, and approaches its character more so than the other parent.

5. The character of woolly tomentose petiole of *R. haematodes* is evident, and the peculiarity is that while in No. 3 this character was lost, here it is regained and holds its companion character in subjection.

6. In this case the glandular character of *R. Fortunei* is dominant; this parent apparently transmits this character freely.

7. The influence of *R. Fortunei* in the glandular sepals is noted, and the red coloring of this organ is broken up, somewhat, but a small percentage is evident in the bright red.

8. The crimson pigment of the flower of *R. haematodes* is vanished or latent, and can only be seen as an influx where the lobes are edged a deeper pink.

9. The influence of *R. Fortunei* gives the offspring an extra petal.

10. The crimson pigment of the nectar pouches now reasserts itself, and is plainly evident as scarlet crimson lines, the few or 0 yellowish green spots of *R. Fortunei* is held in subjection.

11. Again the influence of *R. Fortunei* asserts itself in giving the offspring a few extra stamens.

12. The glandular character of *R. Fortunei* overcomes the glabrous or floccose character of the other parent.

13. The glandular character is again strong, while the tomentose is vacant.

14. The influence of *R. Fortunei* is faintly seen here as increasing the number of chambers. The number of chambers of *R. haematodes* was indefinite, but related species contain 5-6 and very rarely 8.

15. The seed capsule of *R. haematodes* has given up its character and the oblong capsule is dominant.

HERBERT PRUVEY,
Horticulturist

Seattle, Wash.

(For tabular analysis of characters see next page.)

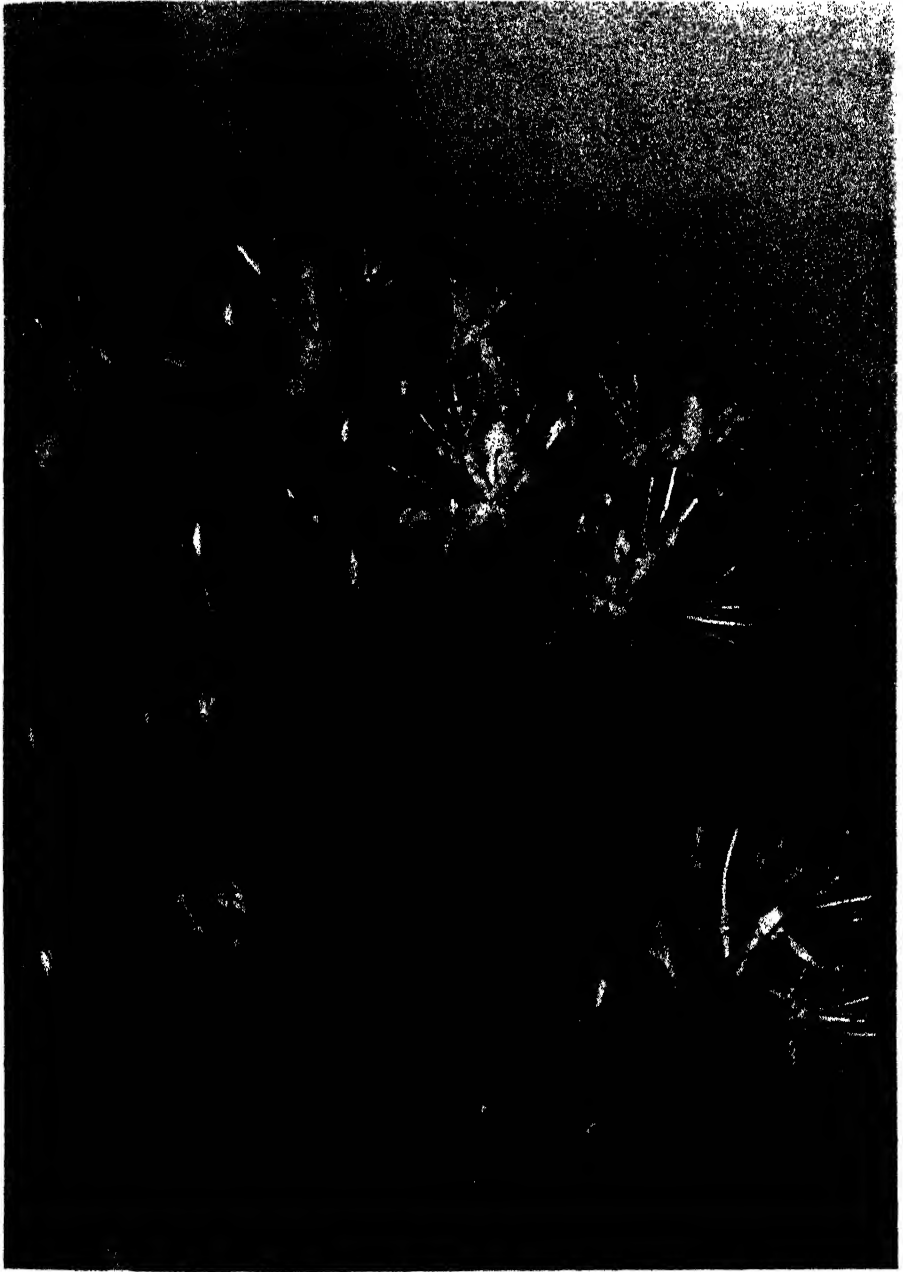
Rhododendron haematodes; Series *Neriflorum*.Subseries: *Haematodes*.*Rhododendron Fortunei*; Series *Fortunei*.Subseries: *Fortunei*.

	Characters of <i>R. haematodes</i> .	Characters of <i>R. Fortunei</i> .
1. young shoots:	woolly tomentose, not glandular.	glandular.
2. leaves:	intermediate, $1\frac{3}{4}$ "- $3\frac{1}{8}$ " long \times $\frac{3}{4}$ "- $1\frac{1}{8}$ " wide.	$2\frac{3}{4}$ "-7" long \times $3\frac{1}{4}$ " wide.
3. leaves below:	densely rufous woolly tomentose.	glabrous to the eye.
4. veins:	7-10.	14-16.
5. petiole:	woolly tomentose.	glabrous.
6. pedicel:	woolly to bristly.	very glandular.
7. sepals:	not glandular, usually red.	glandular, green & red.
8. corolla:	crimson, not fragrant.	pale flesh pink, fragrant.
9. petals:	5-6.	6-7-8.
10. spots	with 5 nectar pouches at base.	yellowish green, few at base, or 0.
11. stamens:	10-12.	14-(15 sometimes).
12. style:	glabrous or floccose.	all glandular.
13. ovary:	tomentose or glandular.	all glandular.
14. chambers:		7-8 up to 10.
15. capsule:	short, thick, straight.	oblong, up to $1\frac{1}{4}$ " \times $\frac{3}{8}$ "- $\frac{5}{8}$ ".

Characters of

Rhododendron haematodes, Franch; \times *Rhododendron Fortunei*, Lindl.

1. young shoots:	woolly tomentose, glandular.
2. leaves:	$4\frac{1}{2}$ " long \times $1\frac{1}{2}$ " wide or less.
3. leaves below:	glabrous to the eye.
4. veins:	12-14.
5. petiole:	woolly tomentose.
6. pedicel:	very glandular.
7. sepals:	glandular.
8. corolla:	pinky white, edged pink.
9. petals:	7-rarely 5.
10. spots	scarlet crimson and in lines.
11. stamens:	10-14.
12. style:	all glandular.
13. ovary:	all glandular.
14. chambers:	8.
15. capsule:	thick, oblong.



Claude Hope

Rhododendron impeditum
(Natural size)

[See page 212]

Two Chinese Rhododendrons [See pages 207 and 211.]

For the gardener whose sole acquaintance with the species of this note is based upon a few plants purchased for his rock garden, it may be difficult to imagine an alpine meadow dotted with these plants or bordered with tangled masses like mountain chaparral. Both belong to the Lapponicum Series of rhododendrons that takes its name from *R. lapponicum* Wahlenb. native to "Greenland; Lapland; Scandinavia; N. Canada." This last species, with *R. nivale* Hook. f. from "Sikkim; Bhutan" and *R. parvifolium* Adams from "E. Siberia" are the only species of the series not from China, essentially Szechwan and Yunnan Provinces.

In the Notes from the Royal Botanic Garden, Edinburgh (Vol. IX, No. XLIV-XLV) Prof. Bayley Balfour published a long paper "New Species of Rhododendron" with considerable attention to this series. While Professor Balfour was more concerned with taxonomic matters, he points out (p. 301) the diversity of growth, the carpet-forming species, the tall shrubs, the dwarf-cushions and the like, while he points out (p. 302) the diversification of soil and natural situation, boggy peaty pasture, open peaty pasture, open marshy pasture, and so on, all bits to excite and aggravate the gardener.

Rhododendron impeditum Balf. f. & W. W. Sm. described by the younger Professor Balfour and the then Prof. William Wright Smith from the Edinburgh Botanic Garden in 1916 (l.c., p. 239-40). Their data is found translated and carried over in Millais Rhododendrons (Vol. I, p. 189). He repeats two Forrest notes — "Dwarf matted shrub of 6-12 ins. Flowers light purplish-blue. On open peaty pastures. * * * * June 1910." "Shrub 6-20 ins. Flowers deep purplish-blue, throat white. Forming symmetrical rounded

tufts on alpine meadows. * * * * June 1910." The first referred to a collection on the eastern flank, the second to a collection on the western flank of the Likiang Range, Yunnan, between 12,000-16,000 feet.

According to Millais, this plant was often in trade then (1917) under the name *R. fastigiatum*. Various descriptive points are given to differentiate them, only one of which need be cited here, that the corolla in *R. fastigiatum* is lepidote () outside, but in this species is not.

Its "nearest ally" was supposed to be *R. scintillans* Balf. f. et W. W. Sm. which has "oblong leaves narrowed to the ends, not elliptic or rounded" as in our species.

Rhododendron intricatum Franch. was based on material collected by Soulié who first collected it "in the neighborhood of Tongolo, Western Szech'wan." "Wilson found it in grasslands around Tachien-lu in the same district at an elevation of 3,600-5,000 m." Forrest found it "on dry ledges and clefts of limestone cliffs on the eastern flank of the Lichiang Range, N. W. Yunnan." "He describes it as a spreading dwarf shrub 2-3 ft. high. Flowers lavender-blue, base of corolla white." (Millais, l.c.)

For propagation, half ripe wood in July is used to make cuttings. These are given a sandy-peat medium with gentle bottom heat. Possibly some modification might be needed for our American temperatures. Although no British gardening dictum need be taken too literally, it is wise to recall that Millais says that this species likes a cool temperature and moist air.

The plants which furnished the photographs were sent from Mr. Carl Starker, Jennings Lodge, Oregon, for that purpose. Recalling our torrid summers and the fate of other high alpine plants, one is almost tempted

to return them.

Mrs. Starker contributes the following notes from their joint experience:

R. impeditum is a small, compact plant, with many small branches which all tend to turn upward, so that it is almost flat on top. It is very slow growing; our fifteen year old plant is nine inches high and has a spread of fifteen inches. The dark green, leathery leaves are about three-eighths of an inch long and about half as wide. They are somewhat hoary on the back, and the new leaves, too, have a grayish cast, so that the general effect of the plant is a sort of grayish green.

The bright blue-lavender flowers are produced in clusters of four. They are an open funnel shape, and are quite large in comparison to the size of the plant. They are produced in such profusion on the crowded shoots that the whole plant is a mass of color. *R. impeditum* will bloom when quite small. We have a plant which is less than three inches high which has ten blossom clusters.

R. intricatum is very similar to *R. impeditum* except for its size. With us, plants of the same age as those of *impeditum* are almost exactly twice as large; our fifteen year old plant is eighteen inches high and has a spread of thirty inches. It has much the same habit of growth, but, as it is taller with longer branches, it makes a more upright bush. Its branches well from the base, but, as all the shoots tend to turn upward, the lower parts of the branches are quite visible. The leaves, which are about twice as large as those of *impeditum*, are not quite so heavy in texture, and are rather bronzy on the back, so that the general color tone of the plant is russet, or brownish green.

The bright orchid-lavender flowers are produced in terminal clusters of six, which makes up for the fact that

they are not quite so large as those of *impeditum*. They appear in great quantities, quite covering the plant. They appear off and on during the summer and fall, after the main blooming season is over.

The Olympicans

The Olympicans, Inc., whose sole object is a state development and beautification are creating much enthusiasm to propagate, plant, protect and publicize the Rhododendron—the Washington State Flower. They sponsor annual Rhododendron Tours, conduct an annual Rhododendron Congress and stimulate Community Rhododendron plantings.

The Washington State Federation of Garden Clubs, Business and Professional Women's Clubs, Congress of Parents and Teachers and many other prominent clubs are supporting the Olympicans in their efforts to popularize the rhododendrons.

At the first community Rhododendron planting, December 8, 1939, at Montesano, there was launched a drive to encourage and assist in the planting of 100,000 rhododendrons, each year, for 10 years.

Governor Martin's proclamation declared December 5, Rhododendron planting day for the State of Washington. Over 1,000 rhododendrons were planted in Olympia, on the Capitol grounds, private homes and other public places in answer to the Governor's request. Throughout the state citizens, clubs and other organizations likewise responded.

The 4th Annual Rhododendron Tour will be held May 18 this year. Citizens, garden club members and other groups are making arrangements to make this annual Rhododendron Tour, and enjoy this unique State Flower exhibition.

W. L. FULMER

Seattle, Wash.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Rock gardening in America is humming with activity. Every horticultural publication has its section or articles on this subject. Almost every issue carries at least a note about rock garden plants, construction or maintenance. More and better rock gardens are being built. Each year knowledge about the culture and propagation or rock garden plants increases. Is this rosy outlook marred by troubles and problems? Frankly, I think we must admit that here and there it is. So let us sit down at a mythical round-table and seriously discuss the long-range outlook and problems of rock gardening in America.

The first rock gardens on this continent were built many decades ago. Carl Cramer, in his book *The Hudson*, mentions "rockwork covered with alpine plants" in Andrew Jackson Downing's garden built over one hundred years ago near Newburgh, New York. However, this form of gardening was not enthusiastically taken up until recently. During the boom years of the twenties and into the early thirties the number of rock gardens increased almost unbelievably. This was the period of numerous "rock piles" and "dog cemeteries." Probably these names are apt, but why criticize gardeners who did not, at that time, possess the knowledge to build better? These "atrocities" gave pleasure to their owners and were an important step forward; they were, I believe, merely the outward signs of healthy growing pains. The selection of plant materials in these gardens was poor and very limited. This was probably due to the relatively small number of rock garden plants "in the trade," the lower cost of "easy" kinds, and inexperience on the part of

the gardeners. Since then these difficulties have become less acute.

In spite of these advances we probably agree that trustworthy information about some phases of rock gardening is rather scarce. No doubt, we have all learned through experience that many of the oft-repeated rules, at first regarded as gospel truths, are not even shadows of the truth when put into practice. Of course, reliable information is accumulating, but it is often hidden by the mass of fallacies and half truths. We might well ask "What can be done to correct this situation?" To me, there is only one answer—direct the future of rock gardening in America through a systematic, far-sighted program.

Rock gardening, I believe, after passing through a period of over popularity, is becoming more stable. Its problems are now clearer and can be more easily attacked. These problems, it seems to me, may be readily divided into four major types—(1) those concerning the propagation and culture of rock garden plants; (2) those dealing with the landscape aspect of rock gardening, which include placement, construction, and proper use of plants; (3) those connected with nomenclature; and (4) those relating to education, that is, getting reliable information about rock gardening to the public.

The method of attack which seems to me to offer the most hope for success calls for *very close cooperation between organized groups of gardeners and scientific institutions engaged in horticultural research*. This type of program has been carried on with marked success by persons interested in roses and other garden plants through their respective societies. Gar-

den clubs and horticultural societies could more actively sponsor and support scientific investigations of rock gardening problems at the various universities and botanic gardens capable of carrying on such work. The technical knowledge, skill, and equipment at these institutions will make possible a more *rapid* and *orderly* progress than will the undirected efforts of individuals no matter how sincerely and vigorously they attack the problems. Such a program would not detract from the pleasures of rock gardening. In fact, it would remove many of the "headaches" which now plague us and certainly would open this type of gardening to many more persons in addition to vastly increasing the kinds of plants grown. When all is said and done, the basic idea behind having plant scientists study horticultural problems is to add to the knowledge of man and thereby have him benefit both culturally and practically.

But do not assume that the individual rock gardener is unimportant. He has been responsible for almost all progress to date and we look to him for further advancement. His findings, when carefully recorded in detail are valuable to both scientific workers and other gardeners. The results obtained by many individuals under varied garden conditions serve as a check on the practices recommended by scientific investigators and frequently make improvements in such practices possible. And, in the last analysis, we can agree that scientific workers only carry out wishes and supply the needs of the individuals.

The horticultural organizations and scientific institutions each play an important part in disseminating facts to gardeners. Through printed material, radio talks and lectures, they act as clearing houses for rock gardening information. As *reliable* data are ob-

tained, they could greatly expand their work. But it is essential that research precede release of information! A great deal has been written and spoken about rock gardening, much, you will probably agree, had been better left unsaid. This misinformation is unfortunate, especially so because we know it was unintentionally given as the truth. Failure of rock gardeners to realize the complexity of the problems with which they were dealing apparently caused the difficulty. Pointing out some of the fundamentals which must be kept in mind if these problems are to be solved will serve to illustrate this complexity.

Since these problems are directly concerned with the physiology of plants and soil relationships, all work must necessarily be approached through these two fields of study, if the fundamental problems are to be understood and solved. Rock garden plants are not unique; their internal processes and responses are governed by the same laws as other plants. This vitally important point is often unknowingly overlooked by non-technically trained gardeners who apparently believe that rock garden plants are subject to their own peculiar set of laws. Many physical and chemical phenomena occur in all green plants. The more important are: food manufacture (photosynthesis); energy release (respiration); movement of materials (translocation); and loss of water to the atmosphere (transpiration). The external, atmospheric environment exerts an influence mainly through light, temperature, humidity, and gases (carbon dioxide and oxygen); the soil mostly through its nutrients, water, oxygen, hydrogen ion concentration (pH), and temperature. All these factors, and others, plus the inherent tendencies of the plant regulate its growth. *The essential point to remember is that changing any one of these factors almost invariably causes*

a change in one or more of the others. Many persons frequently do not recognize this effect and draw false conclusions from their work. For example, a plant which has been growing poorly in a wet soil is moved to a dry soil; it responds with greatly improved growth. In such cases, dryness of the soil is often given as the cause of the improved growth. This may or may not be the truth. It is possible that the reason the plant grows better in a dry soil is because of improved aeration, since dry soils always contain more air than wet ones. If aeration is the important factor, growing the plant in moist but well aerated soil would produce the best possible growth.

Gardeners know well the confusion and attendant evils that exist in the nomenclature of cultivated plants as a whole. The names of rock garden plants are no exception. The proper classification of these plants is difficult because there are few horticultural books which deal with the subject accurately. Troubles beset the gardener even if he locates the names. He has no assurance that they are botanically correct. Authors, in most cases, are forced to use the names supplied by seedsmen and nurserymen, who, frequently not being botanists, apply incorrect names to the plants. The solution of this problem is not easy, but it can be attained, I am sure, if an orderly program is undertaken. Botanists at institutions where the study of nomenclature can be carried on could be encouraged, or better still, sponsored, to investigate problems in this field. Their work is, of necessity, slow and painstaking, but correct names will gradually supplant the incorrect ones in common use, provided the horticultural world feels its responsibility in accepting and using correct nomenclature. The essential fact is—something must be done immediately! The longer

the present situation continues, the more difficult it will be to correct it.

The problems involving the landscape aspect of rock gardening, are, in a sense, not so complicated as those already mentioned. Here, artistic taste is concerned. Persons knowing little about growing plants can construct a rock garden that is artistically correct. Determining the suitability of a rock garden for a given location, for example, and matters involving rock garden design are aesthetic questions. Solutions to these questions are as varied as the tastes of the individuals solving them. What, then, is the problem? It is, I believe, the need for more widespread publication of specific information already available about where and how to build rock gardens. Even though artistic qualities are difficult to define, a methodical approach to the problem is possible. A clear understanding of the fundamentals by gardeners, I feel, would help the situation. But great advancement in the knowledge of rock garden construction can hardly be expected immediately; much work has yet to be done in solving the problems of rock garden plant culture. Since rock garden construction is so intimately connected with these cultural problems, its progress will necessarily be delayed until greater knowledge in this field has accumulated.

So far, only the multitude of problems and difficulties which surround rock gardening have been mentioned. You might well ask, "Has anything of value been accomplished?" Indeed, we can all see that much has been accomplished! As rock gardening on this continent gained in popularity and was taken up by more and more persons, a great many valuable facts were discovered. Although this was the period of unorganized effort, of trial and error, it contributed much towards the development of rock gardening. Now the

movement has been organized and the American Rock Garden Society is its official head. This organization, along with the American Horticultural Society and many others, if given the wholehearted support of rock gardeners, can through directing the future of rock gardening make rapid strides in overcoming the many existing difficulties.

WARREN C. WILSON.

Ithaca, N. Y.

Chrysogonum

According to Small's Flora of the Eastern United States there are two species of *Chrysogonum*. We who have collected these plants in different sections believe we have three. That however, is not the point. If you have never grown any of them you are missing a mighty good plant for shady rock gardens or woodland plantings.

Chrysogonum australe is found in the foothills and sprawls close to the ground. The foliage is rough and rather course but remains green all winter. The flowers which are carried on stems some six inches high are yellow composites. As they spread by runners one soon has a nice colony and as a ground cover they are useful. In spring the many yellow flowers are apt to be one of the best attractions in your garden.

C. virginica grows further east and is more erect. This plant gets to be about ten inches high and instead of creeping, it makes large mats which have the same bright yellow blooms.

They flower the most of the summer. This plant acts more as a biennial with me but as it seeds readily one is always ready with new plants.

ANNIE LEE R. CLEMENT

Asheville, N. C.

Potentilla tridentata

When we think of potentillas we usually think of sprawly coarse plants which as a rule have yellow flowers. These need not be passed by as some horticultural developments have a place in the garden. It is for one of our natives that I want to put in a word. Without any "fuss or feathers" we have a delightful plant which is found on our high mountains, yet does well in almost any situation. *Potentilla tridentata* is one of the best all-round plants I have ever handled. Its a woody shrub some six inches high. The dark glossy leaves are attractive at all times. The small white flowers bloom over a long period. In the rock garden it's ideal, as a few plants in between the stones soon make a compact mat of green. They spread by underground runners as well as seed.

In nature they cling to rock crevices in the most windswept places or grow down in the tundra of the "balds." The soil is often very lean but acid. In cultivation they seem to grow under any condition.

To use them where they can be seen at night is ideal as the five petaled flowers look like stars in the grass.

ANNIE LEE R. CLEMENT

Asheville, N. C.

Cactus and Other Succulents

Echinocactus Grusonii Hildmann.

In *The Cactaceæ* (Vol. III p. 167—seq.) the authors quote freely from a correspondent Mr. E. C. Kost "a private grower of cacti in southern California." Quoting their quotation one reads, "In my garden these plants bloom at irregular intervals for a period of about six months each year. The first flower of the current season opened on May 15 and one is in blossom today, while a number of well-developed buds will open unless killed by unseasonable frosts. The hour of the day that the flower opens varies according to the time that the warm rays of the sun reach the plant. Just as soon, however, as the sunlight leaves the flower, it closes whether it be in the forenoon or afternoon. Clouds obscuring the sun for more than a few minutes or any artificial shade will cause the flowers to close. If conditions are suitable the flowers will open for three consecutive days, closing each night. The perianth-segments of the flower separate very little.

"New plants can easily be obtained either by means of seeds or from cuttings. I have been very successful in obtaining cuttings by slicing off the top of a large plant which causes it to bud freely, and these buds can be cut off and will develop into good plants."

All of this is rather far removed from the potted specimens here, one a resident for three years, the other a newly arrived seedling plant. Here, alas, far from the climate and sunlight of its preferred homes, the plant does not come into its own, for the

translucent spines give only a faint suggestion of their yellow color and possibly half of their proper dimensions. The plant remains, however, an otherwise happy resident, very little out of its normal size and showing the rich green color which in nature makes so fine a foil for its spines.

Being interested in the historical side of all introduced plants, it is interesting to go back to Hildmann's original diagnosis and note in "Monatsschrift für Kakteenkunde" of March 1890 and sense the enthusiasm of the writer or to read Meyer's even more enthusiastic notes in the same journal in 1915—"From the transparent bright golden spines of well cultivated specimens, there is almost a radiance that is not equalled in intensity in other species known so far." He mentions the difficulties of smoke and dust in city cultures and the need of protection of the green color from too intense sunlight. Other writers particularly E. Hesse (*Gartenwelt* Aug. 1897) stress the difficulties that beset the cultivation of the plant in pot cultures abroad, especially to offset the changes in growth habit that result from modified living conditions.

Since we in the East must grow the species in pots, we must be content with half a loaf and find our pleasure in the fine form of the plant, the translucent spines, the vivid green.

A word of warning comes from California that seedlings must be kept dry in winter since then they are most susceptible to fungus attack if kept too wet.

A Book or Two

Winter Flowers in the Sun-Heated Pit. Kathryn S. Taylor and Edith W. Gregg. Charles Scribner's Sons, New York, 1941. 294 pages and plan. Illustrated. \$3.50.

This excellent and timely book covers a wider field than its title indicates. It contains an interesting introductory chapter on the origin and development of the greenhouse, implemented by a carefully compiled bibliography, and in addition to the main theme of pit houses, covers the construction and management of a lean-to greenhouse and a comparison of advantages and disadvantages from actual experience, and the pitfalls to be avoided. While it does not pretend to be exhaustive of the subject and is based on the authors' actual experience, it adequately covers the subject and is interestingly written, as well as conveniently and systematically arranged for frequent use, with a wealth of detail.

The first section is devoted to the construction, cost, management and general gardening procedure in greenhouse and pit, and the second section to plants for pit and greenhouse: necessary tools, culture and propagation, woody and herbaceous plants, cacti and succulents, hardy bulbs, bulbous, cormous and tuberous-rooted plants. There then follows a tabular list of plants for pit and greenhouse, with data arranged by columns as to type, season, whether for greenhouse or pit, soil moisture, propagation, and any special treatment. Last of all there is a drawing clearly showing the construction details of a pit greenhouse. Likewise the book is amply illustrated.

This book, from the standpoint of pit and cool greenhouse, is especially timely in view of the threatened shortage of fuel in the coming winter. It

should be a great help to beginners and even some help to old timers. A wide range of plant materials can be grown in a sun-heated pit, such as azaleas, camellias, alpine plants, begonias, early seedlings for flower border and vegetable garden, etc., and a pit is economical and easy to operate. The pit especially offers, I believe, an economical and satisfactory solution in this country of the problem of wintering, propagating and growing of difficult rock and alpine plants; at least in those portions where it is very difficult to grow them. The reviewer has seen a modification of the pit here described in use in central New York State for the successful wintering of choice alpinists under difficult conditions and temperatures of twenty or more degrees below zero.

Mrs. Taylor is chairman of the horticultural committee of the National Council of State Garden Clubs, Chairman of the New England Section of the American Rock Garden Society, as well as instructor in the Lowthorpe School of Landscape Architecture at Groton, Massachusetts. Mrs. Gregg is one of the early pioneers in the art of pit gardening.

R. C. M.

Hortus Second. Compiled by L. H. Bailey and Ethel Zoe Bailey. The Macmillan Company, New York, 1941. 777 pages. \$12.00.

It is perhaps an admission of childishness to write that a dictionary is always a delight, no matter what the quest. This book, so much enlarged and rewritten over last time, holds the same sort of casual pleasure, even for the person who is not searching. For the latter, the present edition, which is not a reprint, offers much that is new.

There are murmurings among the botanists that all is not as it should be in some cases; there are remarks from the gardeners in others, but what could be expected that might suit each camp equally well?

For the present reviewer the most interesting inclusion is the apparently greater number of tropical and sub-

tropical species that are making their appearance, which should delight the winter gardener in the South. The latter will not find keys, since they are not within the purpose of the book, but he will find many bits of general information that should serve as guides and make his searching shorter. Like its predecessor, this is indispensable.

Correction

Note to the Editor

DEAR MR. MORRISON:

The pictures of tropical water lilies in the recent issue of THE NATIONAL HORTICULTURAL MAGAZINE were very interesting. However, I note that the first one is named Alice Tricker. In 1939 on a visit to Mr. Tricker's, I first saw this lily. It was obviously Mrs. G. H. Pring, unchanged and unimproved. I spoke to Mr. Tricker about it, and told him if I ever saw the lily published under the name Alice Tricker, I would feel obliged to write the organization responsible for the publication.

He admitted that it was a selection from Mrs. G. H. Pring, and the time I took specimens from both varieties for comparison. The bulletin describing Mrs. Pring (reprint from our An-

nals) was in Mr. Tricker's library and was used for the final identification. Alice Tricker checked in every detail as a typical Mrs. G. H. Pring, and I had thought I had convinced Mr. Tricker.

Since this is the first time I have seen the lily published as Alice Tricker, I hope you will make this correction in your next issue. With best personal regards and good wishes, I am

Very truly yours,
(signed) G. H. PRING.

GHP/RL

Copy to Mr. Tricker.

Editor's Note. Alice Tricker was first listed in the Tricker catalogue in 1936, was illustrated there in 1937 and has appeared there every year since. The root was purchased, as were all the others, in the open market, this root from Tricker's. B. Y. M.

The Gardener's Pocketbook

Symplocos tinctoria L'Her.

Many a gardener has started on a trail of discovery from what he has seen or half seen from a train window. In mid-March, en route to Wilmington, N. C., the view from such a window was made interesting by the sight of an unfamiliar flowering shrub in the mixture of willow, aronia and the like. As it grew in what appeared to be cut over woodland, it made a many-stemmed bush not over ten feet high with the stiff, upward-angled branches, leafless apparently and clothed with creamy-white flowers that obviously studded the stalks.

Inquiry at Wilmington gave no clue, so an afternoon trip in the direction of Castle Hayne made collection possible, and in turn an identification through the kindness of Doctor McVaugh. This it seems is the sweet-leaf (*Symplocos tinctoria*), an American representative of a large family that is more largely represented in warmer climates than our own.

The only exotic species cultivated here is *S. paniculata* which has been figured in our magazine.

In Hough's useful handbook of Trees of the United States and Canada (p. 381) there are several quotable passages.

"The sweet leaf is a small tree occasionally attaining the height of 30 or 40 feet with rather wide open top of slender branches and a trunk 8 or 10 inches in diameter. *** Loves shade of forest.

*** Each branchlet is upturned and bears near its tip a cluster of drooping leaves. Its identity can at once be detected by the segmented pith of its branchlets and the agreeable somewhat sweetish flavor of its leaves. It inhabits rich well-drained but moist soils of the forest of the South Atlantic and Gulf States, from the coast to an altitude of about 3,000 feet on the Allegheny Mountains and is an especially pleasing object in early spring when its old leaves of the preceding season are withering and falling to the ground. *** The leaves and fruit yield a yellow dye and the bitter roots have tonic properties."

No word is mentioned as to the color of the fruits though they are pictured and described here and elsewhere as dry drupe-like fruits! Doubtless, if they had been blue as in *S. paniculata*, some mention would have been made.

No notes have been discovered so far to suggest that the plant has been grown in gardens. One certainly wonders if the rather pale blossoming would warrant its inclusion. (The effect is not much more intense than that of spice bush in the North.) Nor have we discovered any note to suggest how far north it might grow beyond the reported natural range.

From the Midwest Horticultural Society:

Pæonia suffruticosa

While on one of the much-touted garden tours this spring I was pleasantly

surprised to notice some unusual plants in the small park in Holland, Michigan. One of the most interesting parts of this park was a bed of tree peonies, *Paeonia suffruticosa*, in full bloom. While this particular planting seemed to contain only a white and a red there are many other varieties that can be obtained. In the Chicago area at least these beautiful plants need to be retarded so that the capricious spring weather does not cause the buds to blast. Certainly anyone visiting the town of Holland should see this park and observe the tree peonies as well as the other unusual plants in it.

ELDRED E. GREEN

Verbena canadense

One of the relatively newer rock plants in this region is *Verbena canadense*. This verbenas is truly perennial and is as near an everbloomer as it possibly can be. While it is native somewhat south of this area it is perfectly hardy and tends to naturalize itself. The color of the round flower clusters is typically reddish-purple but some forms run into a blue and others into cerise. The plant creeps for considerable distance and tends to root at the joints. The flowers are produced from early summer until hard frosts occur. As a spreading border plant or a trailer in a rockery this verbenas has many good qualities. Outside of the color, which may be considered as magenta by some, the only objection could be to the spreading habit and tenaciousness of the plant. In some places this might cause crowding of weaker plants in the vicinity.

ELDRED E. GREEN

Larix laricina

One of the causes for wonder in this region is the seeming neglect of worthwhile plants by later generations. In

many old plantings especially around farm homes and in small towns a number of beautiful and interesting plants can be seen that are not noticed as young plants in newer plantings. One of these is the common larch or tamarack.

The larch is generally restricted to the sphagnum bogs which are scattered throughout the region. Here the plants occur in a peat soil that is saturated at all times. However, as some of the leading plant ecologists have pointed out this plant is a swamp dweller mainly because most plants will not grow there and it can. In other places it must compete with many other plants and is usually killed out while still a seedling.

When planted in good soil the larch develops into a symmetrical spire with the light green foliage covering the slightly drooping branches. These plants as seen along the country roads never fail to attract much attention. Generally these large specimens are not recognized as being the same plant that is seen in the bogs.

The culture of the larch is not difficult. A good soil that is either moderately moist or wet is suitable. Plants are best handled with a burlapped ball but probably bare root transplanting when the needles have been shed for the winter would not be unduly risky. Small plants are quite attractive although lacking the droopiness of the old specimens.

Liriodendron tulipifera

One of the less common native trees that has been called to notice during the last few years has been the tulip tree, *Liriodendron tulipifera*. This has been called magnolia in the several instances that I have heard of. Although of the magnolia family the peculiar two lobes and square end of the leaf readily

distinguish it from the true magnolias with oval leaves.

The flowers of the tulip tree are not very showy and are usually produced only on large trees. As an ornamental lawn tree the globular shape and the beautiful foliage should place this in the foreground as something different and attractive. Being a native of the woodland borders this tree will stand full sun or partial shade. It is indifferent as to soil but does best on a loam. Like other members of the magnolia group this should be transplanted in the spring, preferably burlapped.

ELDRED E. GREEN

Elliottia racemosa [See page 224]

Elliottia racemosa!

Few names among plants conjure up so much interest. To those who have seen it in bloom, it brings to mind visions of entrancing beauty.

It first became known over one hundred and twenty years ago. How difficult it is to understand why it has not been more sought after, why indeed the horticultural world has not been clamoring for it in its gardens these many years.

Elliottia racemosa was found in southern Georgia by Stephen Elliott who included its description in the first volume of his well known and extremely interesting "A Sketch of the Botany of South Carolina and Georgia," which was published in 1821.

Encroachments of civilization in its natural territory wiped out many of the original stands and for many years *Elliottia* was thought to be on the verge of extinction.

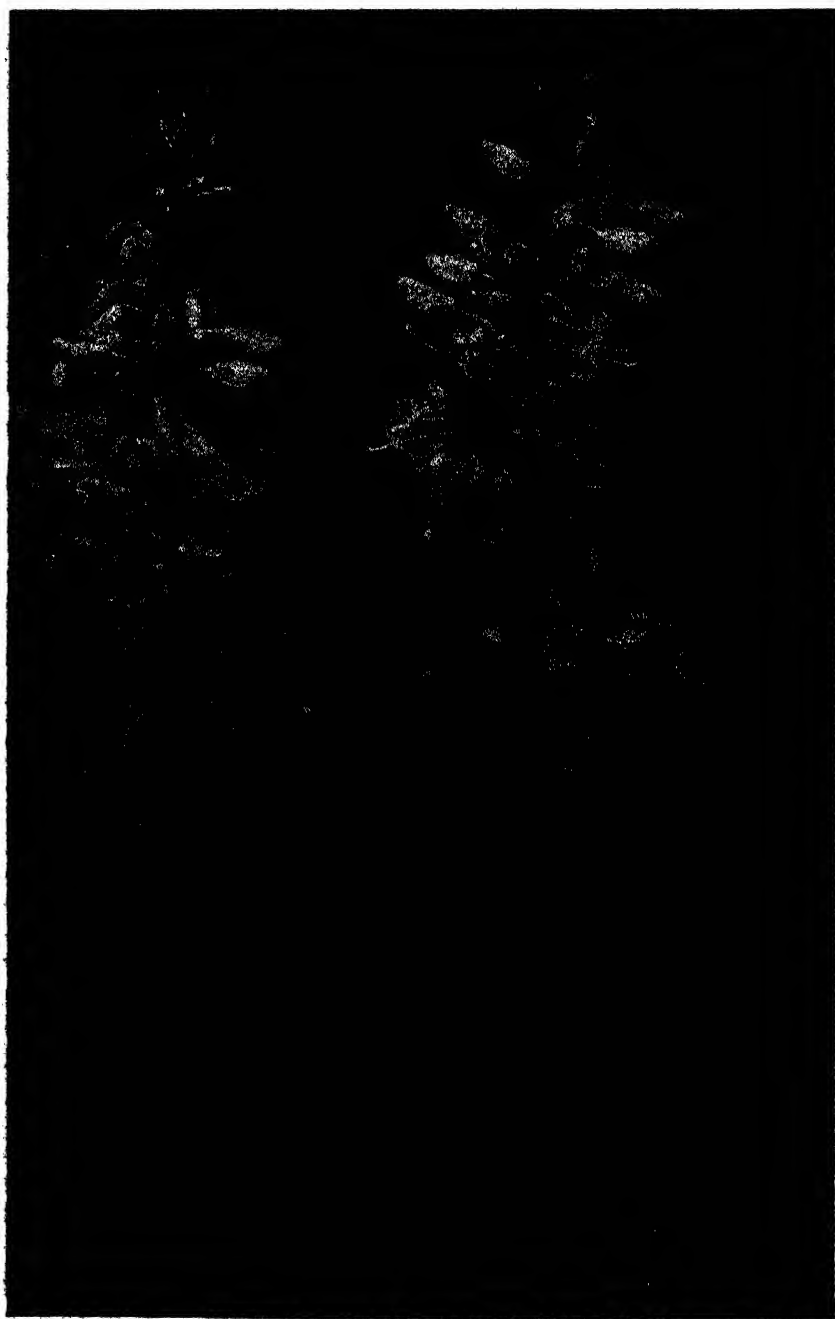
In 1933 when Dr. Small published his famous "Manual of the southeastern Flora," he said of *Elliottia*, "One of the rarest of American shrubs, known to have been found at but seven or eight stations, and at some of these now exterminated." This together with

the fact that it was believed to be sterile to its own pollen, gave much anxiety as to its future to botanists and lovers of native shrubs. An excellent and interesting article on this phase of *Elliottia's* existence appeared in that splendid botanical magazine, *Bartonia*, No. 9, by H. Trudell.

In recent years Dr. E. T. Wherry has found new stations of *Elliottia* and now we realize that although far from plentiful, it is not quite so rare a shrub as it was supposed to be. However, its range is a very restricted one and its habitat should be preserved before it is too late, else this fine plant may be lost forever.

Elliottia racemosa is a deciduous shrub, rarely a small tree. In habit of growth it greatly resembles other members of the ericaceous tribe, such as vacciniums and azaleas. Recently in the Bulletin of Popular Information sent out by the Arnold Arboretum, there appeared an interesting and enlightening article by W. A. Knight describing *Elliottia* in its Georgia home. He mentions an *Elliottia* tree, "more than 30 feet tall with a trunk measuring 5 inches in diameter three feet from the ground." This one grew in moist soil. Sometimes, however, it makes its home in dry, sandy ground and then reaches only the dimensions of a shrub. Coming from Southeastern Georgia, it is of course a coastal plain shrub and so requires the soil conditions demanded by coastal plain plants.

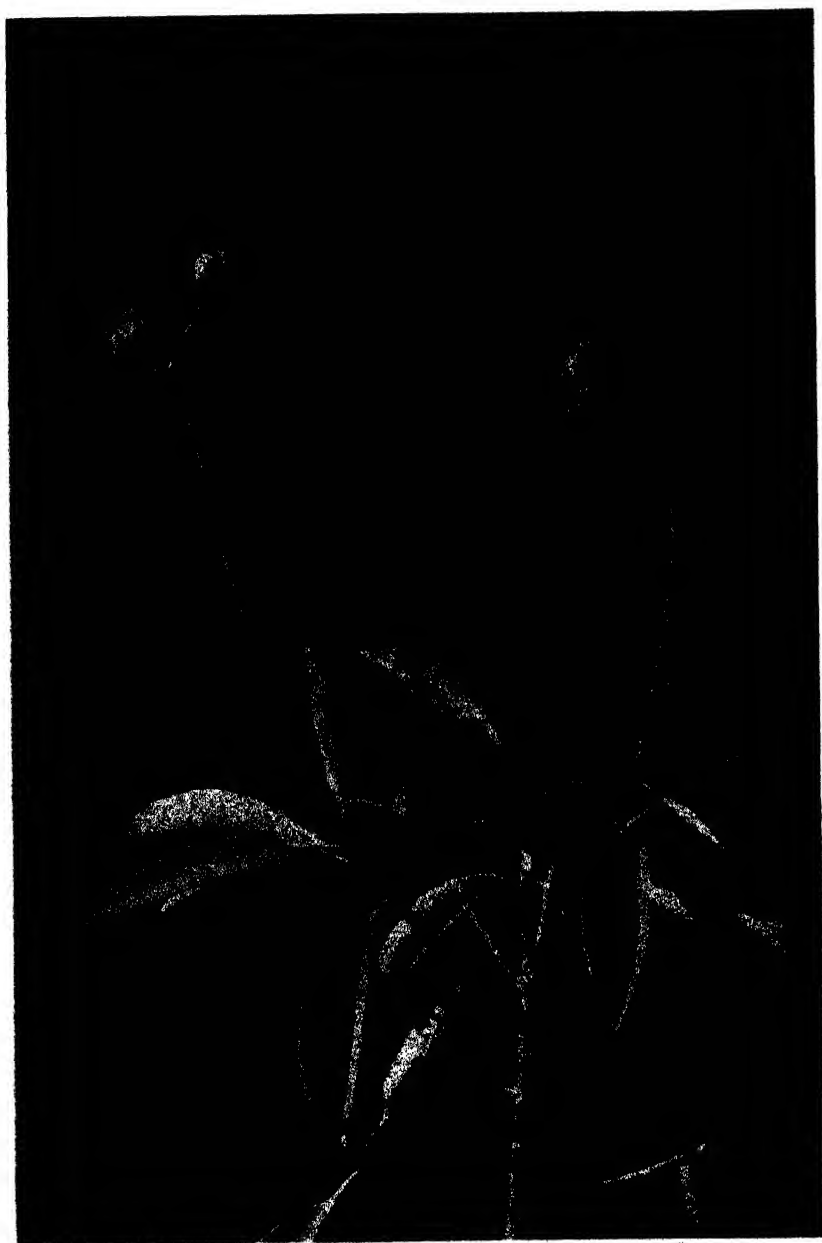
Strangely enough for a member of this family the flowers of *Elliottia* have petals instead of the usual corolla. Botanists say that this marks it as a very primitive heath. The extremely lovely racemes of flowers are of a most unusual appearance and stand up well above the foliage forming a bush of conspicuous beauty. The pure white blossoms are composed of narrow petals, the showy stamens tipped with yel-



• Josephine de N. Henry

[See page 223]

Elliottia racemosa at Gladwyne



Josephine de N. Henry

Elliottia racemosa, in fruit at Gladwyne. It has been considered sterile to its own pollen but no other *Elliottia* was growing near this plant.

low pollen protrude far beyond the petals and so does the style which curves in graceful fashion. The handsome flowers last long in bloom. The oblong deep green leaves are usually about three to five inches long and form a fine background for the handsome pure white flowers. In autumn the foliage remains on the plants for a longer period than is usual for deciduous shrubs and turns to splendid shades of crimson before it falls.

In 1936 a few living specimens of *Elliottia* were sent to me to add to my collection of American plants at Gladwyne. After several years of observation I believe this beautiful shrub may be tried with hope of success from Long Island and Philadelphia southward. In specially favorable situations it may succeed still farther north of its native habitat. At Gladwyne they were planted in several situations and they are doing well except for disasters caused by depredations, underground by mice, and above ground by rabbits. These precious shrubs are now safeguarded with wire.

On many days during the past years I have seen the thermometer hovering around zero, sometimes just above and occasionally just below, but these temperatures caused no winter killing of *Elliottia*, even the young shoots came through unscathed. A few pine boughs were thrown over the ground the first season to protect the roots, and that is all the protection they have ever had.

Elliottia racemosa has been called a difficult shrub to grow, but I do not think it deserves quite such a reputation. However, all members of the ericaceous family do have fine, hair-like roots and must be planted with care in congenial soil. Even if it is a bit fussy and rather slow to become established, it is well worth while expending considerable effort in an endeavor to grow this fine plant. In all probability the

safest way to propagate this rare shrub would be by "stumping," the method used by the late Dr. Coville for increasing *Vaccinium corymbosum*.

My largest *Elliottia* is only about three feet tall but it has bloomed annually since the second year it was planted. It flowers here in June about the same time as *Itea virginica*. Dr. Wherry has seen it here in Gladwyne both in flower and in seed.

It is nice of course to have some foreign shrubs in our gardens. One can hardly do without at least a few "outsiders." A home can scarcely be called a home without its lilac bush. Few, too, would willingly do without one of the large flowering hybrid mock-oranges. *Viburnum Carlesii* is a jewel in any planting. However, our native shrubs, many alas almost unknown to gardeners, are so fine, so gloriously beautiful and so entirely suited to the strange vagaries of their own American climate, that the day is bound to come when they will be appreciated in our gardens. When those shrubs which now bloom almost unseen in our swamps and on our mountainside will be welcomed for their beauty, and must we blush to say it, their rarity in our gardens!

MARY G. HENRY

Gladwyne, Pa.

Lilium Barry Hybrids [See page 227]

Of the various and sundry lily bulbs which we have planted, seeing in the mind's eye great marvels to come therefrom, some, due no doubt to beginner's luck, have come up to expectations; others blooming once have not reappeared, and some few have never come up at all.

None, however, have been more successful, or given us more garden pleasure, than a group of Barry hybrid lilies, seedlings from hybrids of *Lilium* × T. A. Havemeyer.



Hampton Hayes

Lilium, Barry Hybrids

[See page 226]

Ten bulbs, from two to three years old, were planted where the ground slopes toward the north and stays frozen late into the Spring; several of which grew up to six feet in height the first summer (1940) without any very elaborate preparation of the soil.

The variation among the flowers produced an informal artistic effect; from cream blended with palest apricot or buff, deeper apricot, golden-orange to deep salmon-orange; the last being almost a tiger lily color, but the flower, widely expanded without spots, measured seven inches in diameter. Next to it was one which resembled somewhat a Henry lily—an improved Henry, having a larger, more golden colored flower. And while I do not think anyone would wish to see *L. Henryi* and *L. tigrinum* growing in such close proximity, these hybrids are quite harmonious, and by using them one can have a greater variety in a small garden. The orange lily made a cluster of bulblets on the stem near the ground.

The bright colored flowers seem to have little or no perfume; the pale ones are very sweet, and one of their most appealing features is the color in the heart of the flower. The little hollows leading down into the nectaries are a beautiful viridian, the deep glowing green of emeralds, not the light color which is usually spoken of as emerald green. The delicate shades of the perianth are enhanced by this dark note.

With these lilies we planted lavender-blue sage, orange tagetes, blue verbenas, white verbenas, and light blue nierembergia; making a picture which was very nice and much admired by garden visitors.

In an ancient volume of Flora's Lexicon the splendid lilies are described as having the power to restore the mournful to a state of happiness; and the white lilies are an insurance against

disease according to an old Roumanian saying. The evidence of this is born out by the fact that our Slovak neighbor came to beg petals to preserve in alcohol to make, what he called, a magic medicine.

However efficacious for good this may be, the best tonic for gardeners seems to be a new plant to fall in love with.

E. FREEDLEY PRICE

New Hope, Pa.

Crataegus cordata

I have been congratulating myself that the birds have not stripped all the fruits from the hawthorn tree this fall, but looking out just now, I saw two fat robins greatly enjoying themselves. Still, two cannot eat as much as a dozen.

This Washington Thorn, *Crataegus cordata*, is a very satisfactory small tree. The leaves are attractive all the season, shining green until fall, when they turn to most beautiful shades of red and yellow. The flowers are small individually, but as there are many of them in a cluster, they are showy enough. They bloom here in late June, after most of the early shrubs are past. The drooping clusters of scarlet fruit hang on the trees all winter, unless birds and squirrels decree otherwise. In the spring, we are apt to hear the first whisperings of the cedar waxwings from this tree, as they finish the fruit. A tree twenty feet high and wide, thickly covered with scarlet fruit, is a heartening sight against the snow.

The tree is native from Virginia to Alabama, and from Illinois to Missouri, and is perfectly hardy here in New England. It will grow to forty feet in height. The leaves are somewhat heart-shaped at the base, with three to five acute lobes, and a serrated edge; two to three inches long, and nearly as wide

at the base, with slender petioles. The flowers are hardly half-an-inch across, five-petalled, white, about twenty in a corymb. The individual fruits, barely one-fourth inch in diameter, are flattened globose, shining, scarlet, with persistent black calyx bases. There are up to five bony seeds, which require two years to germinate. The fruits have very little pulp,—are mostly skin drawn over the seeds,—but what there is has rather a sweet, pleasant flavor.

The leaves are sometimes troubled by aphids, but seldom seriously. The branches sometimes break in ice-storms, but oddly enough the only hurricane damage was the blowing off of a few leaves and small twigs. Some of them landed in unsuspected places, as we discovered to our sorrow when cleaning the garden in the spring, for the tree is armed with vicious spines often more than two inches long. However, they make excellent phonograph points.

RACHAEL CAUGHEY

Antrim, N. H.

Chionanthus—The Fringe Tree

Chionanthus retusa, *Chionanthus virginica*—both these small trees, the one native to China, the other to our own United States, are, in the Spring, the most beautiful small trees imaginable. Yet they are rarely seen.

Some years ago, we were suddenly called upon to supplement the decorations to be made at Strawberry Mansion, one of the old houses in Fairmont Park, Philadelphia, for the first afternoon meeting of the Garden Club of America week.

We were to go in early with any branches of shrubs and any extra tulips and other spring flowers that were available. The summons came quite late in the day before and on going out to the garden to see what was in condition, I was struck with the exquisite

snowy effect of the Fringe tree in the early moonlight of the approaching night. "Should one risk a branch or more?" "How does it keep in water?" for so often a discouraging wilt takes place after the thirty mile drive to the metropolis, while the near-by suburbanite comes in gaily with huge branches of weigelia, mock-orange and so forth.

To be daring is not my forte, still the shears clipped several of the flat spreading boughs laden with their shimmering long white filaments and they were dumped into laundry tubs overnight. Next morning they were shifted to the back of the car, and the journey made. Arranged in one corner of the great long drawing room, they created quite a stir and even knowledgeable ladies from afar queried "what is that marvelous and most unusual flowering shrub?"

The best placed *Chionanthus* I have is along a stream and some *Clematis virginica* has of late years seeded beneath and clambered up its main trunk. So that in September it repeats its beauty of the preceding May and one recalls that delicious season all over again, and often if truth be told, in better weather, for September is not threatened with those sudden cold wet showers that turn May into a sad mess often with one's best laid plans for tea and garden views all upset.

Another use for the *Chionanthus* is as a potted dwarf tree, to be brought in-doors from a cool house and thus enjoy for a week or so, at close quarters what one sometimes has but a brief glimpse of during the changeable Spring days. This horticultural feat I have never encompassed—it remains in mind from a picture in an English gardening paper in those happy leisurely days before this terrible catastrophe overtook us. Now alas! the pages of this gardening Weekly are filled with "Dig for Victory" articles, and now and

then a sad word of shrubbery and lawns turned under for potatoes.

FRANCES EDGE McILVAINE

Downingtown, Pa.

Some Notes on Oregon Irises

During the season of 1941, after an exceptionally mild winter, the Oregon irises in the garden began blooming before the first of March, and were not quite gone on the tenth of June. This means from the opening of the first bright yellow *innominata* on its four-inch stem, the last day of February, till the fading of the last few blooms of a buff-yellow *douglasiana* hybrid two feet tall.

Though I have not kept a careful record in previous years, I believe this is an extraordinarily long season of bloom, due partly to the early start, and partly to the cool May weather, which prolonged the life of the flowers.

Innominata is usually an April flower here. The colors now that seedlings have begun blooming, range from a deep glowing, but not harsh golden orange, to creamy yellow, and this year I acquired a collected white one, which may or may not survive. Height in this species varies with individual plants and in different soils, from five or six inches to fifteen. The tall ones are delightful as cut flowers, but the short type is the one for the rock gardener.

From seed of *innominata* gathered in the garden, we have raised several hybrids, mostly showing *douglasiana* parentage in the broad foliage. These show the *innominata* yellow mostly in the throat, so it is more apparent in the bud than in the open flower, for the sepals are washed with blue, lavender or old rose, and the petals are white or very pale orchid.

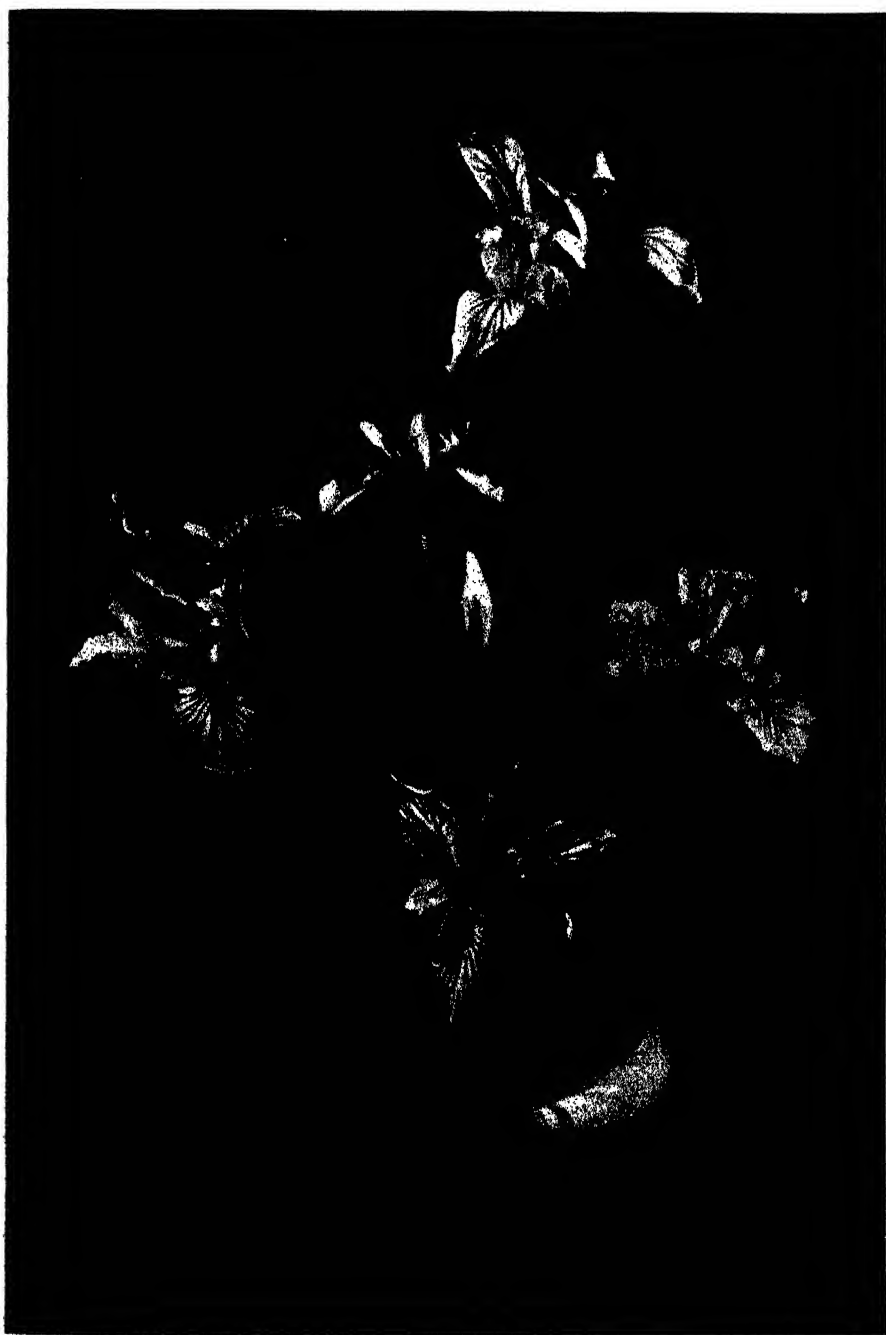
However, a few have been found which have carried the yellow in the throat, with yellow petals and sepals

shading from yellow to a splotch of deeper color, rose, lavender, tawny. This yellow is not the clear yellow of the *innominata* parent, but a soft peach shade.

Tenax, usually a May flower along all the roadsides, lasted all through April in the garden this year. It too has crossed by means of the benevolent interference of insects, (high time they did something benevolent in this garden) and now, what with choosy collecting and garden intermarriages, we have many variations on the purple theme. There are blue lavenders and pink lavenders, short stocky ones and taller ones with long stems and velvety purple flowers. There were white ones, but something always happens to the white ones. This year, light and dark old rose ones of unremembered origin, which we have diligently increased by division, made a fair showing.

According to the latest Oregon botany, Manual of the Higher Plants of Oregon, by Morton E. Peck, *Iris gormanii* is reduced from specific rank to a variety of *tenax*. Here it blooms two weeks later than the purple *tenax*, and differs from it in having grayer foliage and creamy yellow flowers. Among the seed grown *tenax*, appear many hybrids, apparently crosses with *douglasiana* and *thompsoni*, a lavender to purple iris from southwest Oregon considered by botanists at first as a color form of *innominata*, which it much resembles on all but color. Most of these hybrids have a longer throat, or as the botanics call it, perianth tube, than *tenax*, and this gives the flowers a more graceful poise than its somewhat stiff-necked flowers.

In the Siskiyou mountains there is an iris, growing mainly in shade, which is commonly known as the "little white iris." *Iris chrysophylla* is not completely white, however. The sepals are conspicuously veined with yellow or pur-



Left, *Iris Thompsoni*; center (below) *I. Chrysophylla*; center (above) *I. tenuis*; upper right, *I. macrosiphon*; right, *I. innominata*, yellow form.

plish lines, and the tips washed with light color, sometimes blue, sometimes yellow. The throat is very long and serves it as a stem, like that of the crocus. The seed capsule is borne just at the surface of the ground like crocus. In size of flower and particularly of sepals, it is quite variable, but the stigma crests are always remarkably long. The flower is much overtopped by the long blue green leaves.

Iris missouriensis is less at home here than the other kinds, for it is from the hot summer, cold winter section of this state and Washington. It likes a moist place a good part of the year, and is at home in heavier soils than the western Oregon kinds. It grows sometimes three feet tall in cultivation. The color is mainly light blue, and whites are not infrequently found. Because of its greater hardiness, it should be used by the few people who are seriously trying to breed new forms of these Oregon irises.

On the watersheds of just two Oregon rivers, the Clackamas and the Mollalla, grows the small woodland *Iris tenuis*. Its slim five or six inch stems stand primly among the light green, rather broad leaves. The little flowers are exquisite, white, picked out with purple and gold. The leaves disappear in winter. We have found it bloomed more abundantly after we set it partial shade than it does in the thickly shaded forests of fir where it naturally grows.

Most of these irises are too large for small rockgardens, though *innominata*, *thompsoni*, and *chrysophylla* are good rock garden subjects. They are particularly suited with a well drained hillside, having some shade during part of the day. *Iris douglasiana* grows near the sea, in sun or shade, but seems to do better here in the garden, with a little shade from distant trees. This flower, especially in the hybrid forms such as those which Fred deForest, of

Monroe, Oregon, has originated, are fine cutting material. Sent in the bud stage, they have carried well from here to Massachusetts, opening out a half hour or more after they were taken from the airmail package and put in water. Some of these hybrids carried several flowers on a stalk, and their season of bloom varies somewhat, so I find a row of the different kinds furnishes flowers a month or more.

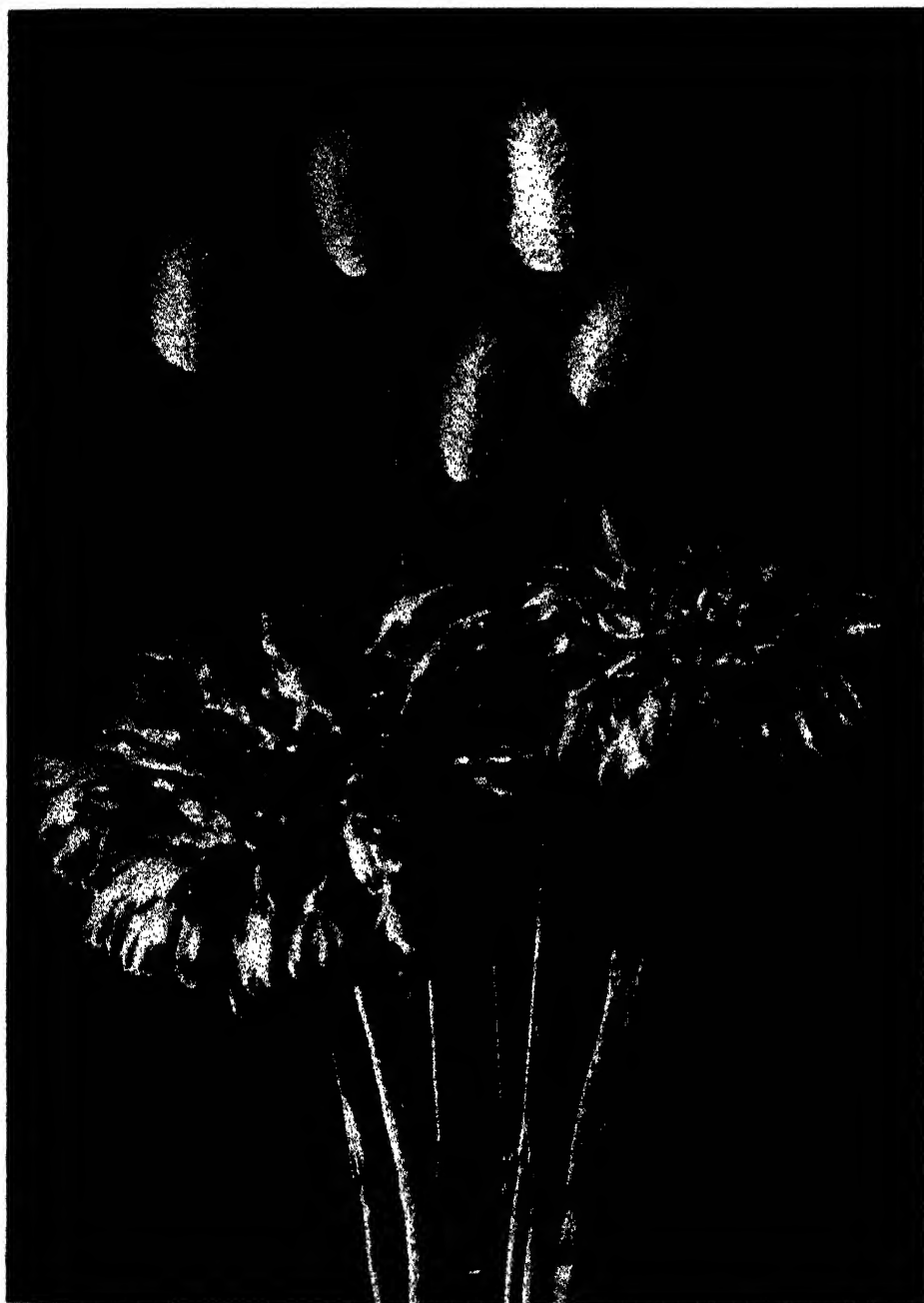
Irises often mix in the wild stands, and it is quite possible to see the intermediates, as one leaves, for instance, the *douglasiana* territory and approaches that of *bracteata*. Between localities in which I knew *innominata* and *chrysophylla* were found, I came upon a CCC crew blasting a bridge approach out of a rocky canyon wall. Some of the irises that I rescued after the blast went off, have turned out to be an intermediate strain, taller than *chrysophylla* or *innominata*, but with many characters of both. They are different shades of yellow, with attractive veining, and the flowers are large and graceful.

DREW SHERRARD

Oswego, Ore.

Dilatris corymbosa Berg. [See page 233]

A pretty flower frequent on plateaux and mountain slopes in the Cape Province of South Africa, found occasionally also on the Cape Flats. The species long known by this name is now the subject of an article in "The Journal of South African Botany," vol. vi, October, 1940, by W. F. Barker, who in studying specimens of the mauve-flowered species finds differences in them which, she considers, entitles them to be separated. The photograph shown here would indicate that it is a true *Dilatris corymbosa*, for two stamens are slightly prominent in the flowers as they are in the illustrations in Miss Barker's article. *Dilatris Pil-*



South African Railways and Harbours

[See pages 232 and 234]

Lagurus ovatus (upper); *Dilatris corymbosus* (lower)

iansii (Barker) the new species described, has stamens much shorter than the perianth segments. This species, Miss Barker says, is the one illustrated in Marloth's "Flora of South Africa," vol. iv, t. 31 (1915) and in "A Second Book of South African Flowers," by Barclay, Bolus & Steer, page 131 under *Dilatrix corymbosa* Berg.

The third species of mauve-flowered ones is *Dilatrix ixioides* Lam. which has the stamens well exerted, the third anther very large. The picture called *Dilatrix corymbosa* or Broad-petalled *Dilatrix* in "Exotic Botany" by James Edward Smith, President of the Linnean Society, (1804-5) vol. i, page 29, t. 16 would seem to be this species, judging by the very long prominent stamens. This species is not found, according to definite records, on the Cape Peninsula. Flowers of another species, *Dilatrix viscosa* Linn. f. are dull orange or mauve-yellow.

Dilatrix corymbosa has a flat, umbel-like head of numerous, somewhat bell-shaped flowers of an attractive purplish-lilac or mauve color. The flower segments persist and keep their color in withering. The head is 2-3 inches broad or a little more. Two of the three stamens are longer than the third, this third one having a large anther differing in color. The perianth segments are ovate-lanceolate, sub-acute, up to about $\frac{1}{2}$ inch long and $\frac{1}{4}$ inch broad. The whole inflorescence is hairy or downy. The stem is rather long, with a few short leaves. The basal leaves are numerous, linear-oblong, about 6-15 inches long and $\frac{1}{4}$ inch broad. The root-stock is reddish, woody and the rigid basal leaves are arranged in two ranks. The plant blooms in South Africa from August to January.

Dilatrix belongs to the *Faemodora-ceæ* of the Monocotyledons. Lt-Col. Grey in "Hardy Bulbs" vol. ii (1938) page 151, says that it is an easy subject

to grow. He says that he has often raised it from seed and that in Great Britain it blooms as a rule in July.

A specimen found by this writer near Cape Town in December, 1934, which is listed in the Herbarium of the New York Botanical Garden as *Dilatrix corymbosa* is, in conformity with Miss Barker's division of the species, probably *Dilatrix Pillansii*, as the stamens appear to be short. The color of *Dilatrix* is very lovely.

SARAH V. COOMBS

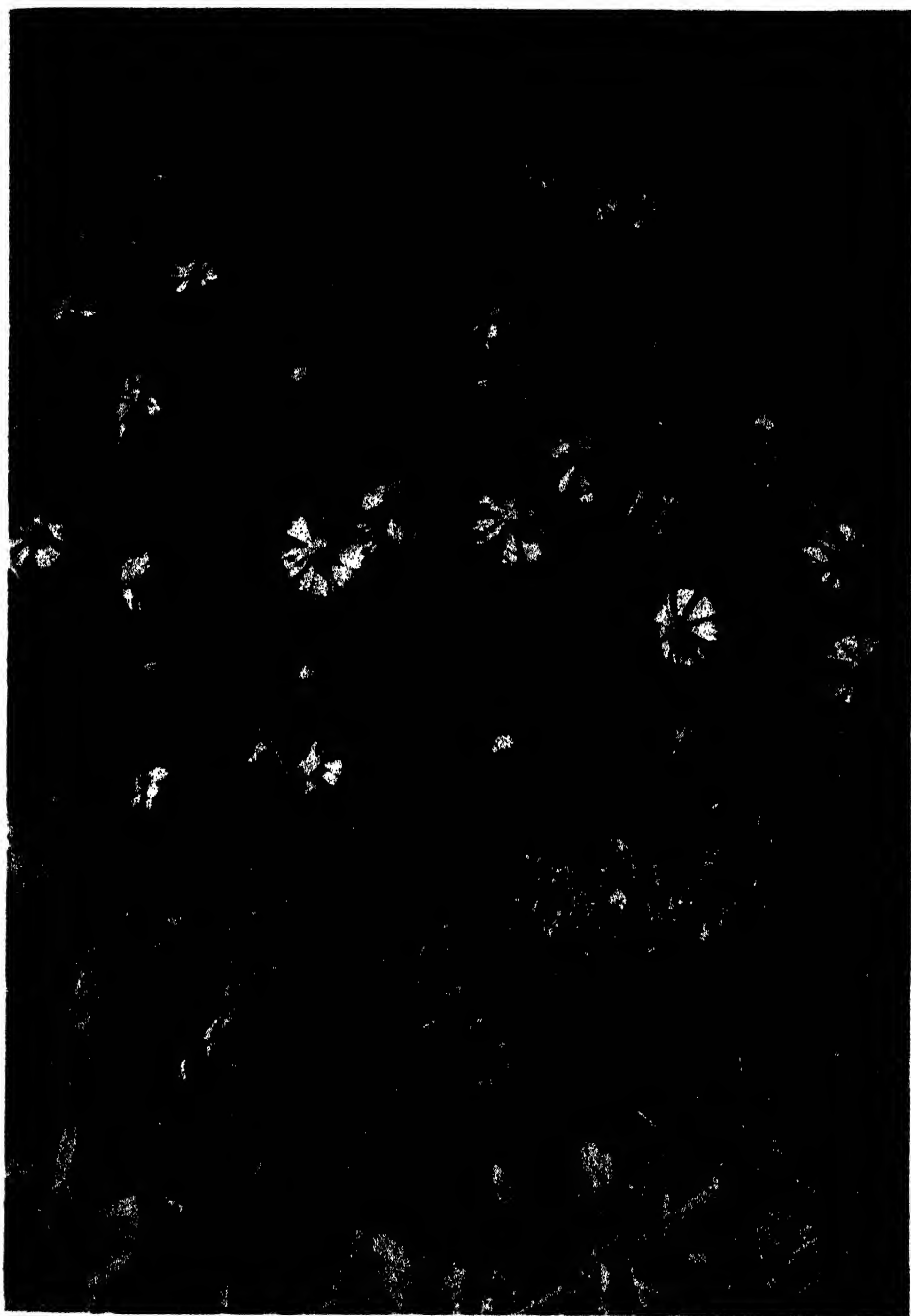
Scarsdale, New York.

Lagurus ovatus Linn. Gramineæ. [See page 233.]

Hare's Tail Grass Rabbit-tail Grass.

This hardy annual grass grows in many parts of the world, being found native or naturalized, in the Mediterranean Region, west coast of Europe, the Channel Islands and California. The Kew Index credits it originally to northern Africa and southern Europe.

Hortus says that "it is grown for ornament in flower gardens and pots and for dry bouquets." It grows about 6 inches to a foot or more high, with 1-flowered spikelets in a close panicle, forming an ovid head. There are two dry, persistent, chaffy glumes or outer scales covered with fine woolly hairs and ending in feathery points. The outer paleæ or bracts of the flower terminate in two long bristles and have a longer dorsal twisted and knee-bent appendage. The inner bracts have no such appendage but the pointed tips are slightly cloven. The stems are smooth and slender and the soft, almost silky spike of a pale whitish hue, may attain a length of about 1 $\frac{1}{2}$ inches, with a diameter of nearly an inch at the base. The leaves, 4-5 in number are linear-lanceolate, with long inflated sheaths which almost cover the stem. These sheaths are densely covered



Walter B. Wilder .

Helium tenuifolium

[See page 236]

with downy hairs. The silky appearance of the flower head is due to the numerous soft hairs which fringe the glumes from top to bottom. The stem is upright, smooth, circular, with three or four joints. The root is annual, composed of seven or eight woolly fibres.

The genus, long considered monotypic, now has a couple of species added in supplements of the Kew Index, one found in Sicily and one in Ceylon.

Rabbit-tail Grass is cultivated in gardens and flowers in June, ripening its seed in July. Charles Johnson in "The Grasses of Great Britain," (1861) says that it is "an elegant little grass but of no economical value." E. J. Lowe in "A Natural History of British Grasses," (1858) sets it a little higher, saying that it is "one of the rarest and most beautiful of our English grasses, growing in sandy exposed situations in the north and west of Guernsey, one of the Channel Islands, abundant near the sea-shore. Serves to decorate flower pots in winter, like *Stipa pennata* and the foreign *Briza maxima*."

The name is derived from the Greek, *lagos*, a hare; *oura*, a tail. It is said by Nicholson in the Dictionary of Gardening to thrive best when grown in pots during August and September, wintered in a cold frame or greenhouse and planted out in the open the following spring.

There is a great difference in the size of the flower heads and in the height of the plant. The tiny ones seem to be found mostly on the sea-shore and the taller ones inland. The little sea-shore ones look as if crouching to avoid the fierce winds from the ocean. The plant is an excellent addition to winter bou-

quets for people who like those dust-attracting combinations.

SARAH V. COOMBS
Scarsdale, New York.

Helenium tenuifolium. [See page 235]

Many annuals are short-lived in the neighborhood of Westchester County, New York; the heat of summer with frequent droughts is undoubtedly the cause. Watering with cold alkaline water is not much help. Whether the seeds are sown in the greenhouse, and the seedlings transplanted twice to encourage root growth before being planted out or whether the seeds are sown in the beds where they are to flower, with far too few exceptions, the life of the annuals is short. They soon grow leggy and in time produce fewer flowers and gradually fade away.

A notable exception is an American plant, *Helenium tenuifolium*. It is found from Virginia south to Florida and westward to Texas, is pretty, flowers with abundance all summer long. As the season advances the plants become bushy and about two feet high. The stalks are much branched and bear numerous long linear leaves. The leaves are so graceful they constitute the principal beauty of the plant. The flowers measure about one inch across, are borne singly at the tips of the branches and have yellow rays and yellow "light cadmium yellow" disk flowers.

The plant is charming with *Nierembergia frutescens*, for the linear character of the foliage on both plants harmonize and the yellow of the *Helenium* goes well with the violet of the *Nierembergia*.

HELEN M. FOX.
Peekskill, N. Y.

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- Chevy Chase (Md.) Garden Club
Mrs. R. Seabury d'Espard,
19 W. Thornapple St.,
Chevy Chase, Md.
- Community Garden Club of Bethesda,
Mrs. Robert Corry, Pres.,
156 Custer Road,
Bethesda, Md.
- Fauquier and Loudoun Garden Club,
Mrs. W. F. Rust, President,
Leesburg, Va.
- Federated Garden Clubs of Cincinnati and
Vicinity,
Mrs. Charles Bosworth, President,
220 E. Locust St.,
Wilmington, Ohio
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Mrs. Edward H. McKeon, Pres.,
Room 300, The Belvedere,
Baltimore, Md.
- Forest Hills Garden Club,
Mrs. E. Barr, Pres.,
3623 Chesapeake St., N. W.,
Washington, D. C.
- Garden Center of Greater Cleveland.
East Boulevard at Euclid Ave.,
Cleveland, Ohio.
- Garden Center Institute of Buffalo,
Delaware Park Casino,
Buffalo, New York.
- Garden Centre,
% Iveys Store,
Asheville, N. C.
- Garden Club of Gloucester,
Mrs. N. S. Hopkins, Librarian,
Nuttall, Va.
- Garden Club of Illinois,
Shop 312, Palmer Hotel,
Chicago, Ill.
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3606 West End Ave.,
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- Garden Club of Virginia,
Mrs. John G. Hayes,
R. F. D. No. 2,
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- Gary Garden Club,
Mrs. Roy Watts, Treas.,
106 N. Hamilton St.,
Gary, Ind.
- Georgetown Garden Club,
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- Home Garden Club of Denver,
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- Liambias House,
St. Augustine Garden Club Centre,
St. Augustine, Fla.
- Michigan Horticultural Society,
Paul R. Krone, Secy.,
Horticultural Building,
East Lansing, Mich.
- Midwest Horticultural Society,
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Walter Beebe Wilder

Echinopanax horridum, Devil's Walking Stick

Plant Hunting in Alaska

WALTER BEEBE WILDER

TO ANY Chechahco (the Indian name for newcomer or tenderfoot) Alaska signifies a wild romantic region perpetually covered with snow and inhabited by Eskimos and bearded prospectors. The appearance of Juneau, Alaska's capital, in July is a very definite shock to one harboring this impression.

The town nestles comfortably at the base of Mt. Juneau and Mt. Roberts whose summits are certainly snow-covered but the Eskimos and bearded prospectors are conspicuously absent.

The flower lover will be surprised to find stocks, nasturtiums, delphinium and lilies thriving in practically every dooryard. In fact almost any plant which can withstand a rainy season will do well. Not cold, but 140 inches of rain or the equivalent in snow a year is the enemy. This heavy precipitation accounts for such glaciers as Mendenhall, Taku and others which are the largest in the world as well as for the fine growth of timber on the lower mountain slopes.

The searcher after wild flowers will find the trail up Mt. Roberts well worth while. Much of the way the mountain is almost vertical and the trail zig-zags back and forth, making an easy climb through a fine forest of Sitka spruce and western hemlock. Many of the trees attain to six feet in diameter despite very shallow soil and the precipitous slope.

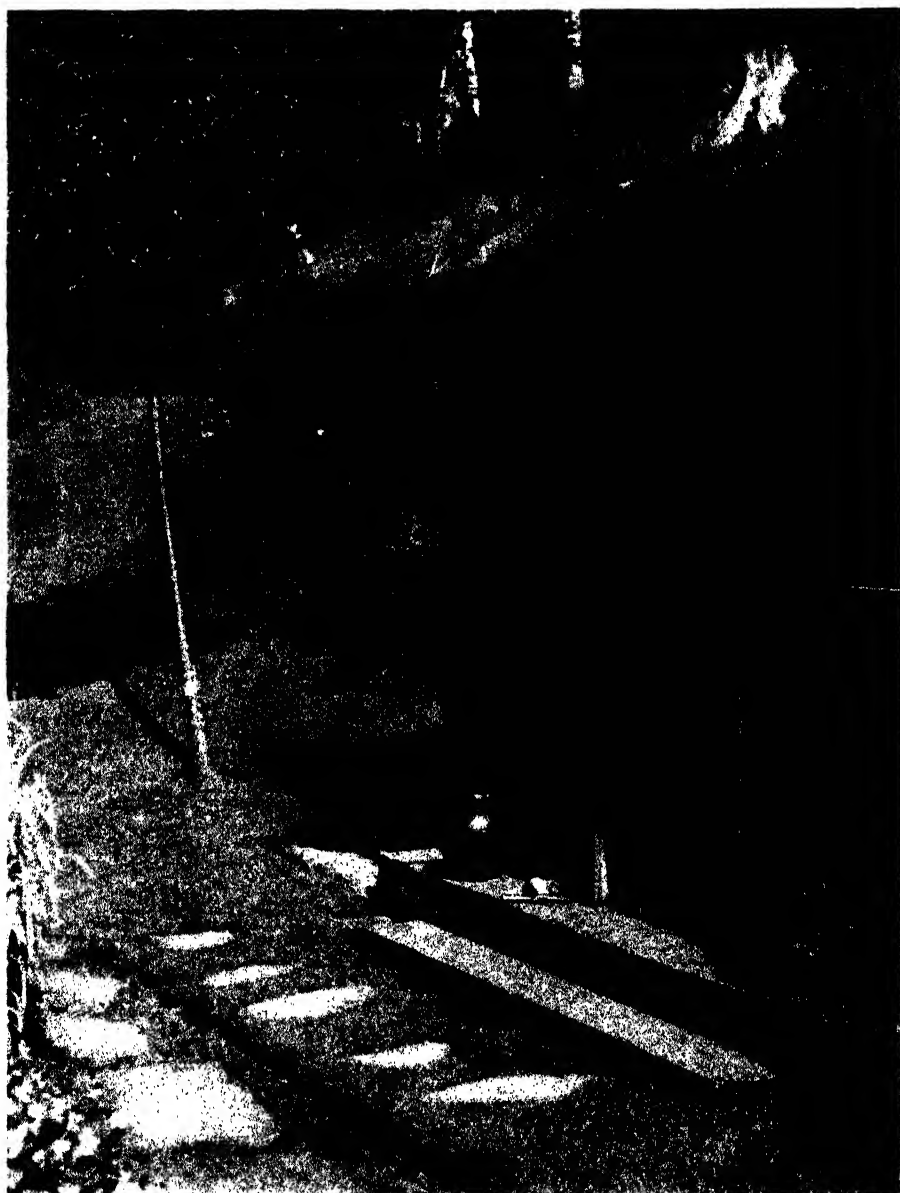
As in the woods of New England and eastern Canada, the tiny dogwood, *Cornus canadensis* is everywhere under foot but here it does not grow with quite the enthusiasm which it displays in the East.

There are patches, particularly in damp hollows, of a plant with enormous leaves and occasional clusters of brilliant red berries which succeed its spike of whitish flowers. It is often higher than one's head and the terrifying array of reddish thorns and prickles along its stems make good the implications of its name, Devils Walking Stick or *Echinopanax horridum*. If you slip when you're climbing and try to grasp it, "horridum" is scarcely the word. Despite the worst intentions, it is a very handsome shrub.

Pyrola secunda is everywhere with its graceful curving five-inch stems of greenish flowers. The white sprays of *Tiarella trifoliata* stand out surprisingly from the shadows.

In glades or spots where the woods are more open, the fine white spikes of *Spiraea acuminata* always appear showing off their graceful sprays three or four feet above the stolid and indifferent heads of the northern yarrow (*Achillea borealis*). Here, too, one is almost certain to find the red and yellow columbine, *Aquilegia formosa*, larger and sturdier than the *A. canadensis* of the East but also more sparing of bloom. There is likely to be a quantity of *Arnica latifolia*, its yellow stars a foot or so from the ground.

Naturally, it will be no surprise to encounter in these open spaces the ubiquitous but, none-the-less handsome, Fireweed whose tall tapering spikes of rose-colored flowers teeter so dangerously on the brink of magenta from coast to coast. The accuracy of this common name was never very apparent to me until I saw a burned-over area of several hundred acres in Washing-



Walter Beebe Wilder

A Garden House in Juneau, Alaska



Walter Beebe Wilder

Stream near Juneau, Alaska

ton which was literally covered with the plant. It had even outstripped the blueberries in its redecorative effort and cast a weird rosy veil over the blackened ground as far as the eye could see.

Less well known but, to my mind, more beautiful is the dwarf *Epilobium latifolium* which, at Juneau wanders from sea level far above timber line, almost to the edge of the snow. The flowers are about the same color as those of its relative but very much larger and borne somewhat more sparsely. At the base of Mendenhall Glacier it actually trespasses upon glacial detritus which is underlain by ice. As with so many plants which seem to seek out hazardous homes, its growth in these locations is more compact but no less, and sometimes more, floriferous.

It would certainly not be fitting to proceed above timber-line without mention of the Alaska lupine, *Lupinus nootkatensis*, whose close-flowered blue and white racemes are so spectacular in southern Alaska. Low meadows are often covered for acres with the gray furry foliage and handsome spikes of bloom. Unfortunately although the plant strays into the heights, it suffers there and definitely puts its worst foot forward.

Timber-line on Mt. Roberts is a sudden and startling change. From dense all-enclosing forest the climber passes at a step into a region of treeless alpine meadows. Instead of the close-packed vertical pillars of spruce and hemlock he is confronted with a prospect limited only by haze and the earth's curvature. Gastineau Channel which, from below, had all the majesty of a Hudson or Mississippi seems now merely a broad blue ribbon with its clean surface marred by the strangely fingershaped

dumps of the A. J. Gold Mining Company. It seems incredible that, from under his very feet, thirteen thousand tons of pulverized rock are added to these slender gray fingers every twenty-four hours, transported at that by the very streams of which he is suddenly aware roaring at his back.

Any weariness from the long climb vanishes like mist from the valleys below as he gazes at the long succession of snow-clad peaks across the Channel or the intricacy of waterways to north and south or, best of all, the meadows, cliffs and snowfields yet to be surmounted.

The flora shows an even more pronounced change. Most of the plants from below which persist above timber-line seem a little alarmed as if the whole thing had been a mistake. *Aquilegia formosa* hardly dares show a flower; *Cornus canadensis* makes itself as small and scarce as possible. *Sanguisorba sitchensis*, whose fragrant white two-foot spikes and serrate foliage decorate the lowland roadsides, seems more or less cheerful for a little way but soon disappears. Only the lesser fireweed seems perfectly at home.

However, there is no lack of plants; they merely change to typical alpine flora. The little aconite, *Aconitum chamissonianum* is everywhere among the grass with its large dark-blue flowers never near enough together to make much of a show. Equally modest is *Fritillaria camschatcensis* whose nodding bells on four to eight-inch stems are so dark a brownish-purple as to be almost black.

The pale pink blooms of *Erigeron perigrinum* show up unexpectedly in the grass singly or in groups, with flowers an inch or more across and stems varying from six to eighteen inches according to the pressure of their neigh-



Walter Beebe Wilder

Epilobium latifolium



Walter Beebe Wilder

Epilobium angustifolium



Walter Beebe Wilder

Silene acaulis

bors. One plant of the high meadows which seems unconcerned with its companions is *Castilleja parviflora*, an Indian Paint Brush which refuses to hold its raspberry-colored head higher than twelve inches regardless of surroundings. Its relative in this strange parasitic family, *C. pallida*, is more susceptible to environment and is tall (to two feet) when its neighbors are tall and low growing when they are likewise. It even shows its yellow green head far below timber-line on occasion.

I had almost reached the snow line and glimpsed a tuft of *Silene acaulis* when I realized that dusk was descending. Instead of sensibly following the regular trail I skirted the summit and

after a time found myself in a deserted mining camp, as wierd and lonely a place as I have ever seen.

Buildings were windowless, machinery lay rusting, test-tunnels exhaled a cold draft into the gathering darkness. Added to my troubles was the fact that numerous pale flowers beamed at me from the margin of the mountain stream which I elected to descend. I dared not stop to identify them.

As I reached the bottom of the valley I ran across a small shack. The last ray of sunlight between the peaks shone through a window and guess what it illuminated; not a rare plant but a case of dynamite! Civilization at last.

Bronxville, N. Y.

The Camellia

GEORGE GRAVES

THE camellia is now enjoying a revival of interest, in greenhouses in the North and in the open in southern and west coast gardens. This present spurt in popularity harks back over nearly 100 years of quiescence to the first half of the 19th Century.

Many of the varieties which are now being grown are vegetative descendants of the very plants which bloomed in the greenhouses of plant hobbyists along the eastern seaboard 100 years ago. During the long interval when camellias were out of favor, many varieties, through negligence or lack of interest, lost their labels, others were subjected to multiple rechristenings, and still others dropped from sight altogether.

Still another form of present confusion is the result of the persistence of old names currently attached to quite unauthentic material. It is not at all unusual for several clones with quite different flowers to be offered under the same well established old name, sometimes on the same catalogue page.¹

Just as the plants are confused and confusing, so also is the literature which has grown up around the cultivated camellia. One unskeptical author has copied the other or has set down conclusions at which he has jumped rather than arrived, with the result that there seems not to be in English any complete and accurate historical account of how the camellia got from the Orient to wide development and distribution in western Europe and America by the opening of the 19th Century. It is worth while to try to get at the straight record of the plant's westward migration.

Botanically, the camellia is an Asiatic

member of the tea family, which family has such native American representatives as *Stewartia* and *Franklinia*, both of southeastern United States. The latter was long placed in the genus *Gordonia*, which was named for James Gordon, who after serving as a gardener on the first estate in Europe to grow camellias, established the famous Mile End Nurseries in London in 1742 and became, seemingly, the first commercial grower of camellias.²

In general, camellias may be looked upon as being evergreen trees or shrubs with lustrous, alternate leaves and perfect flowers which are borne one at a time in the axils of the leaves. Gardeners are interested principally in but two of the approximately 45 species of camellia which have been found in tropical and subtropical Asia—*Camellia japonica* and *C. sasanqua*.³

Both of these species were known to European botanists before they were brought into cultivation in the Occident. There is a picture of the so-called scarlet-rose tea (*C. japonica*) in the first volume of James Petiver's "Gazophylacium Naturae et Artis" published in the first decade of the 18th century.⁴ Petiver has it listed as *Thea chinensis pimentac jamaicensis folio roseo, flore rosco* and not *flore pleno* as misquoted by Claudia Phelps.⁵ The plant which Petiver illustrated was single pink or, as he put it, "roseo simplici."

It must be remembered that Linnaeus had not yet created the name "camellia" and applied it to these plants.

The next important listing after Petiver was Kaempfer's "Amoenitatum Exoticarum," published in 1712.

Kaempfer listed both species of camellia together with numerous variants, under the Japanese name of Tsubakki. —There was San Sa, vulgo Jamma Tsubakki for *C. japonica*, and Sasanqua Tsubakki, etc. Incidentally, Kaempfer's drawing of *C. japonica*, probably made from life in the Orient and showing a seven-petalled flower, is still one of the best.⁶

The camellia, particularly *C. japonica* with single and double, white, red, and purple flowers, had long been cultivated in the Orient on an ornamental basis.⁷ Its introduction into European gardens was evidently a by-product of the attempts of numerous 18th century Europeans—including the great Linnaeus—to bring the tea plant of commerce into occidental cultivation. Much energy and ingenuity was expended before John Ellis was able to write to Linnaeus from London in 1769 that "I make no doubt that by this time twelvemonth we shall have many hundred plants of the true tea growing in England."⁸ But in the meantime, much grief had been encountered. For instance, Osbeck got a living tea-tree as far as the Cape of Good Hope only to have it wash overboard in a storm. Another living tea plant, consigned apparently to Linnaeus, was actually brought as far as the Cattegat by a Scandinavian ship's captain only to be stripped of its bark in a single night by rodents. This sort of tribulation is all too familiar to gardeners, whether of the 18th or the 20th centuries. Or, as Linnaeus summed it up, "So adverse is Fate on some important occasions."

It seems that the shipping problem was finally solved, after a number of experiments fostered by Ellis, by importing, not plants, but seeds which were specially treated to preserve their viability or which were sown sometime during the long voyage home and thus

arrived in Europe in a condition to permit their safe handling.

One of the difficulties encountered in several of the attempts at importing the tea plant was that, after successfully overcoming the hindrances to the importing of live plants of some age, those plants turned out to be, not the tea plants in China, but rather camellias. This disconcerting experience came to Linnaeus about the middle of the 18th century.⁹ Also, somewhat later, to the King of France, and to John Ellis in London.¹⁰ The idea seems to have been held by numerous interested Europeans that the crafty Chinese were not anxious to give up the true tea plant and thus lose the sale of tea, which at that time amounted to a monopoly. Hence, plants which closely resembled those of the tea were substituted. In the case of the two camellias which Lagerstroem brought to Linnaeus in 1755, Ellis claimed that the Chinese had pulled off the blossoms to deceive the European sailor at the time he was buying them. This seems to be in line with Osbeck's story of how, in his voyage to China, about 1750, he bought from a blind man on the street a camellia "which had double white and red flowers." But Osbeck goes on to say, "By further observing it in my room, I found that the flowers were taken from another; and one calyx was so neatly fixed in the other with nails of bamboo, that I should scarce have found it out if the flowers had not begun to wither. The tree itself had only buds but no open flowers."

The same idea is carried over into European cultural literature in the first mention of camellia in William Curtis' "Botanical Magazine"¹¹ which says that the firm-textured blossoms are "apt to fall off long before they have lost their brilliancy; it therefore is a practice with some to stick such de-

ciduous blossoms on some fresh bud where they continue to look well for a considerable time." The same idea was expressed by Chandler and Booth some years later.

Linnaeus published the name *camellia* in his "Genera Plantarum" in 1737, without making reference to the man who was being commemorated.¹² Without doubt, the genus was named in honor of George Joseph Kamel.¹³ Kamel was born in 1661 in the City of Brunn in Moravia, once a portion of Austria but more recently known as Brno, Czechoslovakia.

In 1682 Kamel entered the Society of Jesus as a lay brother. He was probably never ordained, since in 1688, only six years after entering the Jesuit Order, he is reported to have set out for the Marianne Islands, better known as the Ladrões, and devoted himself to botany and pharmacy. He later opened a medical clinic for the treatment of the poor of Manila. Death came to Kamel in Manila in 1706.¹⁴

During his active years, Kamel studied the natural history of the Philippines and transmitted his findings to be published in Europe by such men as John Ray and James Petiver, both in their own publications and as intermittent contributions to the Philosophical Transactions of the Royal Society of London.¹⁵

Despite the stories which have found their way into numerous horticultural publications, there seems to be no positive evidence that Kamel ever saw a *camellia*, much less had anything to do with its introduction into western gardens. The genus does not grow wild in the Philippines and apparently Kamel did not botanize on the Continent of Asia or in Japan. Thus, it would seem that Kamel's connection with the genus *Camellia* consisted entirely posthumous honor granted him by Linnaeus for his

contributions to man's knowledge of natural history. Latinized his name became *Camellus*, and Petiver's *Thea*, Kaempfer's *Tsubakki*, Edwards' and Collinson's Chinese rose took the name of *Camellia*.^{16, 17}

As stated before, Linnaeus published his name *Camellia* in 1737. The record of earliest cultivation of the plant in European gardens is placed by the second edition of the *Hortus Kewensis*—apparently based on evidence supplied by that inveterate letter writer, Peter Collinson—as being in the garden of Robert James Lord Petre at Thorndon Hall, in Essex, in or before 1739.¹⁸ How, from whom, and exactly when Lord Petre got the plant or plants is not clear. Judging from the painting of one of Lord Petre's plants as rendered by the artist George Edwards, and from Edwards' accompanying text, it was a few-petalled red or pink variety comparable to those illustrated earlier by Petiver and Kaempfer. There is some evidence of doubtful authenticity that Lord Petre also had a white-flowered variety; also, that Collinson had some *camellias* in his own garden.¹⁹

Then, there is a report that those earliest plants were thought to be much more tender than they actually were and hence were killed after a few seasons by the mistaken kindness of being grown in an extremely warm greenhouse.²⁰ However, Collinson reported that during a visit to Lord Petre's widow in 1746—about four years after the young nobleman's death—among other plants in the vast collection of tender species which were still doing well at Thorndon Hall was *Rosa chinensis*. By this he meant *camellia* and not the true *R. chinensis* which did not come into cultivation until 1768, some twenty years later.²¹

Although Collinson spoke of this rose-like plant growing in a stove or a

tropical greenhouse, he had previously written of a Chinese tea tree which was growing happily in a temperate English greenhouse along with oranges.^{17a} By the end of the 18th Century the camellia, as well, had become a recognized orangery plant. Some years later its ability to thrive outdoors in lower temperate or sub-tropical areas was recognized.

The camellia did not become important in Europe horticulturally until toward the end of the 18th Century. As stated above, the plant had arrived at various times in Sweden, England, and France by 1770 as a stand-in for the tea plant. The records of all these early importations are none too clear. Also, concerning this period and of later developments, there have grown up stories and traditions which seem to have little or no foundation in fact. For instance, Le Texnier's history of the camellia²¹ stated that the plant was mentioned in the catalogue of the Cambridge Botanic Garden in 1742. This statement is puzzling when it is recalled that the Botanic Garden at Cambridge University did not get underway until 1762 and that the first edition of Donn's *Hortus Cantabrigiensis* did not appear until 1796.^{22, 23} Evidently, Le Texnier misread an earlier statement in the *Herbier General de l'Amateur* which pointed out that the early editions of *Hortus Cantabrigiensis* listed the plant as being in England as early as 1742. Later editions of the latter followed *Hortus Kewensis* in moving the date forward to 1739.^{23a}

There has been other confusion, too, principally as regards the spelling of names; for instance, the varietal name *Donkelaarii*, evidently given to a plant brought home by Siebold and named after two famous Belgian gardeners, father and son, can be found spelled in almost as many ways as there are math-

ematical possibilities. Of course, the variety got off to a bad start when Morren's original publication spelled it three different ways, all of them wrong.²⁴ The present spelling seems as right as any.

Beginning with John Slater's importation of the double white and the variegated red varieties of *C. japonica* through the agency of Captain Connor of an Indiaman in 1792 (or —93?), other oriental garden forms followed quickly.²⁵ The double red, the anemone-flowered or Waratah, the fringed white, the varieties *Wellbankii* and *Pomponia* and others—some of which were to be famed later as seed parents—came in in the next few years, usually by arrangement between individual garden owners and ships' captains. Chandler and Booth in 1831 listed 16 garden varieties as being of Chinese origin. The single white variety which apparently was late in coming into general cultivation is reported by some to have been imported from the Orient.²⁶ Chandler and Booth, however, stated that this last was raised from seeds in England by Messrs. Rollinson about 1814.²⁷

By this time camellia interest was high and becoming widespread, both in England, on the continent, and along the Atlantic seaboard in the United States. Interest in direct importation from the Orient slackened and growing and selection of seedlings was undertaken on a very large scale. The first named seedling variety of European raising was apparently exhibited by a man named Ross at a show of the Royal Horticultural Society in 1824.²⁸

These early 18th Century collections were increased by methods little different from those which Cunningham and older travelers had observed among the Chinese in the previous century. Seeds, however, were seldom formed

without artificial pollination. This latter practice led to the idea of calling unusual seedlings hybrids. As in the case of interfertilizing the garden forms of the common lilac, the parents being all representatives of the same species, the offspring are, of course, not hybrids in the true sense.

Camellias were also increased vegetatively by layering, cuttings, and various ways of grafting. In recent years, grafting methods have given way largely to own-root processes, principally cuttings.

The first camellia to reach America was apparently the single red type which John Stevens, of Hoboken, New Jersey, imported from Europe in 1797. Three years later, Michael Floy, later a prominent New York nurseryman, brought a plant of the double white variety from England to add to Mr. Stevens' collection. New England was not far behind, because in 1806 John Prince had also received a plant of the double white through Joseph Barrell of Charlestown, Massachusetts. Further collections were assembled in Philadelphia, Baltimore, and other cities. By 1826 (or —27) William Prince published a catalogue listing no less than 53 available varieties.

There is also the legend that the first camellias in the United States reached the neighborhood of Charleston, South Carolina, before 1785, through the agency of Andre Michaux, a plant and wildlife collector sent out from France.^{20, 30} Three of what are supposed to be original Michaux plants are reported to be still alive in the recently restored garden at Middleton Place. Another has been reported still growing in the neighborhood of the former Michaux garden.

That this tale has lost nothing in the telling seems indicated by the fact that Michaux did not arrive in America un-

til 1785 and did not go to Charleston until sometime in 1786, at the earliest. There is a South Carolina record reported by H. A. M. Smith that a deed to "Goose Creek, French Garden" was passed to Michaux on November 3, 1786.³¹ Unfortunately, that portion of Michaux's Journal recording his movements from the time of his arrival in New York in October, 1785, until April 19, 1787, is not extant. On the latter date, however, he notes: "Venu de Charlest. a la Plant.," thus indicating the previous establishment of the Charleston nursery, in which he assembled American plant material for export to France.³²

Michaux is also reported to have interested himself in the importation of foreign plants into the United States. This phase of his American experience is supposed to have been most active during 1790 and 1791 when contact with Europe was broken by war between England and France. Deleuze states that Michaux naturalized several Asiatic trees, "the seeds of which he had procured from American captains trading to China."³³ The camellia could well have come to Charleston by this means. However, Deleuze does not list it with other Michaux introductions such as the tallow tree, the scented olive, the silk-tree, or the Persian pomegranate. Whether Michaux actually imported all these plants into the United States for the first time is problematical, since in a letter to John Ellis dated March 21, 1774, Dr. Alexander Garden reported having a year-old specimen of the tallow tree.³⁴ Nor did John Drayton list either the camellia or the tea among the exotic plants in cultivation in the Charleston area in 1802.³⁴

Although direct trading with the Orient was not reported by Drayton, it is possible to assume that the camellia

might have come to South Carolina as a substitute for the true tea plant of commerce, just as had happened in Europe years before. However, it seems more likely that the Charleston camellias came to this country from Europe expressly for garden ornament. By 1770 the British and French had imported both camellias and tea plants. In 1774 Dr. Garden reported sowing tea seeds received from John Ellis in England through the agency of a returned traveler named Blake.^{8a} Whether Garden's seeds developed into plants is not certain. However, tea as such is mentioned in one or two reports soon after 1800.

One anonymous correspondent to the "Southern Agriculturist" wrote in 1830 that he had seen tea growing 25 years previously on Skidaway Island, at the mouth of the Wilmington River near Savannah.³⁵ Another unknown writer in the same periodical had stated two years earlier that the tea plant had had its start in the Carolinas in the Charleston nursery of Philippe Noisette about 1913. From the meager records available, it appears certain that the serious culture of the tea plant was restricted to that nursery for at least 15 or 20 years.^{36, 36a, 37} Considering Noisette's French connections, it is quite possible that he had something to do with the growing of the first camellias in South Carolina.

Thus, the arrival in Charleston of camellias remains a matter for conjecture. When, whence, how and through whom they came is as yet an unsolved problem.

The so-called type and variants of *C. japonica* are known in the South as simply japonicas. This species is less tea-like in aspect and has larger flowers which appear later in the season than do those of that other important species, *C. sasanqua*. In aspect, *C. sasan-*

qua is a much less strong-growing plant, of loose, straggling habit, with flowers usually solitary and terminal, rather than lateral as in the case of the *C. japonica*. In the type plant known usually as Lady Bank's camellia, which Captain Welbank brought from the Orient in the East Indiaman Cuffnells in 1811, the white flowers are small and open in November and December.^{27a} In general, *C. sasanqua* bears closer resemblance to the tea plant of commerce than does *C. japonica*. In horticulture, its habit of blooming early is of considerable importance and interest.

The high point in camellia interest seems to have been in the 30's, 40's and 50's of the 19th Century. It was then that several authors, such as Chandler and Booth in England and the Abbé Berlese in France, published volumes which together contained hundreds of colored plates illustrating desirable varieties. Evidently, Berlese wrote his "Iconographie" as a camellia book to end camellia books, and yet some years later Verschaffelt in Ghent published 13 volumes, each containing 48 colored plates of varieties mostly untouched by previous authors.^{38, 39, 40} And so the list of varietal names went on lengthening. Anyone who takes the trouble to examine these older books—and there have been no new ones of importance since that time—will realize just how difficult or, in some cases, futile it is to try to identify plants of old varieties which have lost their labels. And, of course, not all camellias of 100 years ago were named and introduced. There were large collections of unnamed seedlings.

The Abbé Berlese did try to bring order into the cultivated camellia situation by suggesting in his monograph of the genus two systems of classification.⁴¹ One was based on "ascending

chromatic gamuts, of the tones and natural shades of the flowers." The other system took into consideration the shape and arrangement of the flower parts. The first edition of Berlese's monograph was translated by Henry A. S. Dearborn, first president of the Massachusetts Horticultural Society, and was published in Boston by Joseph Breck & Company in 1838. The classification based on flower form did not appear in Berlese's monograph until later editions and, hence, is not considered in Dearborn's translation. This is the system which, with some modification, is now being used widely in the United States. It can be studied in its present form in Mrs. Phelps' contribution to the Bulletin of the Garden Club of America of March, 1940.

Another important and often overlooked Boston contribution to camellia literature was the series of articles written for Hovey's magazine by Marshall P. Wilder—beginning with its first issue in 1835. Also, there was his paper on pollination and seedling raising in the Transactions of the Massachusetts Horticultural Society about 1847.

Most of the many books on camellias discuss their cultural requirements to some degree. However, the most complete and the only exclusively American treatment of the subject was written by Robert J. Halliday, and published in Baltimore in 1880. For years it remained the last significant contribution to important camellia literature.

MASSACHUSETTS HORTICULTURAL SOCIETY.

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Louis Buhle

Fragrant Garden

A Garden of Sweet Perfume

HELEN M. FOX

ALL GARDENS are supposed to be sweet smelling. However, there are many plants in our borders such as dahlias, gladioli and most of the tulips which are scentless and grown for their colors, or delphiniums grown for their stately spire-like inflorescences. Not all people agree on what is agreeable in fragrance. Some like the odor of rue or hyssop which is unpleasant to others, and there have been men or women who do not like the scent of tuberose. It is not only the flowers which are fragrant but frequently the leaves, though these sometimes give forth their perfume only when they are rubbed between the fingers or bruised. In medicinal plants and perfume herbs the seeds and roots are sometimes fragrant.

In planning a Fragrant Garden one should not have all the scents of the same family or all of them sweet, but should introduce a few plants with bitter or piny scents to contrast with and enhance the flowery. Yet, no matter how carefully the flowers would be placed to waft forth their fragrance in rhythmic sequence, wind and weather—dampness, frost or rain—would alter the intensity and quality of the emanance of scent from the glands in the leaves and flowers.

Most fragrant plants come from warm climates and do best in a sunny situation, where they have protection from the north by a wall or shrubbery. Except the mints which thrive in a damp place, all other herbs prefer a

somewhat sandy soil and good drainage. There are many plants with fragrant flowers at home in the woods but they will not be included in this paper which is devoted to a small perennial garden growing in the sun.

Chinese and Japanese artists plan their gardens for solitude and meditation and furnish them with symbolic stones, plants and streamlets to evoke the concepts of their religious beliefs. Americans plan their gardens for out-of-door rooms and to look like pictures. They use the plants for line and color but without a deeper significance. As with all pictures, a frame gives the garden depth and precision and emphasizes the end and beginning of the composition. The frame can be a clipped hedge or naturalistic shrubbery. When the hedge is to be strictly architectural in line, no plant is better than box, *Buxus sempervirens*, which has enclosed pleasures from the days of classical antiquity down to the present era. The leaves are particularly fragrant after rain, after they have been clipped and when the hot sun shines on them. The smell is warm and reminds one of old time colonial or European gardens with brick paths and geometrically patterned beds. As an ending in the north, *Buxus microphylla korcana* takes the place of Edging Box, *Buxus sempervirens suffruticosa*, and makes a low spreading plant, green all winter but with a slight yellow cast. In the north, arborvitae, Carolina hemlock and some of the junipers also provide fragrant, exact looking frames.

When the hedge is not to be clipped it could be composed of Sweet Briar roses, *Rosa rubiginosa*, having leaves fragrant of resin when wet by rain. South of New York, rosemary, with light blue flowers blooming in the short days of late winter and early spring and lavender with violet spires rising from

grey leaves, furnish poetic enclosures and still nearer to Mexico the garden could be framed with *Salvia Greggii* varieties with white as well as rose-colored flowers intermingled. The three last mentioned have fragrant leaves as well as flowers. From South Carolina down, *Osmanthus fragrans* or *Osmanthus Delavayi* with glossy foliage and deliciously scented flowers make sturdy hedges.

When the garden is small, a hedge composed all of one kind of shrub provides unity and looks better than one of many varieties and species, but the collector of fragrant plants might prefer a mixed frame to his garden in order to have as many plants as possible in a small space.

If the frame is composed of a mixed shrubbery, in the back, there might be a strawberry-bush, *Calycanthus floridus*, with shiny leaves and pompon-like dark red blossoms strongly fragrant of strawberries.

Beside the strawberry-bush would rise *Vitex Negundo incisa*. South of Philadelphia, *V. Agnus-castus* would be included. *Vitex Negundo incisa* comes from northern China, Mongolia and Korea and as might be expected, is perfectly hardy. The shrub grows to ten feet high and is wide-spread and every part of it is characterized by a smooth elegant texture. The leaves are divided into five leaflets which are spread far apart and impart an airy look. They are "parrot green," the longest measure four inches in length and four and a half across and they smell agreeably of pine blended with a flowery quality. The flowers grow in spike-like racemes, are labiate, of "light violet" and the lower lip has a white furry hump and a violet line down the center. They exhale a fragrance of heliotrope and bloom from mid-July until after a hard frost in October. *Vitex*

Agnus-castus, called chaste-tree, hemp-tree or monks' pepper-tree, comes from southwest Europe and western Asia. The leaves are palmate and the spires of flowers are blue in the type, white in *alba* and pink in *rosea*.

Another member of the mint family for the shrubbery is mint shrub, *Elsholtzia Stauntoni*. It is hardy although it dies back a little during the winter in my Peekskill garden. The shrubs require a sunny situation and the plants thicken in a short while and can be increased from divisions, as also from cuttings. The stems are stiff and ridged. The thin-textured leaves are pointed at both ends, wider below the center, toothed along the margins, except the lower fourth and measure one and a half inches across and five inches in length. They are yellow green, glabrous and smell of mint when rubbed between the fingers. The flowers are arranged in spire-like inflorescences about five and a half inches long and at the termination of the branches. They are borne to one side of a velvety plum-tinted stalk, are tiny, close together, and pink tinted lavender, "light mauve," with pistil and stamens exerted and of the same color as the corollas. They smell deliciously of forget-me-nots, keep well in water and bloom from the end of August deep into September. Recently a form called *Farguhari* has come into the market which differs from the type in having larger flowers of a deep "amparo purple" shaded "violet purple."

A plant with a suede-like surface and foliage fragrant of pine is blue-beard, *Caryopteris incana*, which opens its clusters of slaty blue flowers the latter half of September. The bush is about two feet high and although Mr. Rehder lists it for Zone VII it is hardy when in a sheltered position in my garden, which is Zone V. The plants are in-

creased easily from cuttings and develop into new plants so quickly they can be treated as annuals, if the gardener has a greenhouse. The stems are much branched and covered with bloom while the leaves are ovate, roundedly toothed half way down from the tip and dark shiny green above and grey-green on the under surface. The flowers, in flat clusters, two together, grow to one side of the stem. One of the five-pointed lobes topping a tube-like calyx extends into a lip. The exerted stamens, "beards," of grey-blue, are tipped with dark blue filaments and give the flower clusters a fuzzy look. However, though the leaves are fragrant the flowers smell a little like dogs in wet weather. A variety called *superba rosea* has rose-colored flowers larger than in the type and there is also a white form.

Since the stems are prostrate *Perovskia abrotanoides* can be planted in front of the shrubbery. The whole plant is redolent of rosemary. The square stems as well as the much pinnate leaves are grey and the slender spikes of violet flowers are similar to those of the lavenders but much smaller. *Perovskia* prefers a warm sunny place and is readily increased from cuttings.

If there is a sunny slope sweet fern, *Comptonia peregrina*, a shrub two feet or so high, furnishes an excellent covering. The plant, although called "peregrina," which means foreign, is native from Nova Scotia to North Carolina and westward to Indiana. Near my garden it is found on dry, somewhat acid banks and always in the sun, but in cultivation it grows in the shade too. The pendulous brown catkins come in early May and under them are the cone-shaped feminine inflorescences. The charm of the plant consists in the slender leaves, so regularly and deeply toothed as to appear pinnate, and giv-



Margaret DeM. Brown

Origanum vulgare

ing forth a scent of bay leaves, with a dash of lemon and orange peel.

Closely related to sweet fern, being of the same family of Myricaceae and also smelling of bay, are the Myricas. Like the sweet ferns, once the Myricas are established they increase into colonies likely to smother other plants. Bayberry, *Myrica pennsylvanica*, grows well along the seacoast from Newfoundland to Maryland and makes a spreading plant two feet high. The grey branches are oddly dotted with round orange glands as are the leaves. The leaves are glossy green, narrow, wider above the center, toothed along the top with wavy margins and a prominent central vein. The fruits coming after the catkins are grey, have glands and look shrivelled. They furnished the wax for colonial candles, colored them dark green, and caused them to give forth a bay-like perfume as they flickered in pewter holders on oaken tables.

Sweet gale, *Myrica Gale*, is found in Europe and northeastern Asia as well as North America and has narrower and less hairy leaves than bayberry and is not as good looking.

No fragrant garden would be complete without its quota of true herbs, plants used for medicine, perfume or flavor. There would be winter savory, *Satureja montana*, with glossy aromatic leaves bespangled with little white flowers in July and August and *alpina* with purple flowers. The savories with thyme, *Thymus vulgaris*, having grey foliage and pink bloom would margin the beds while the *Serpyllums* in their infinite permutations would carpet the walks, creep between and over stones and sometimes grow into the lawns where they would replace the grass with their mats of closely growing little green leaves and give forth a delicious scent when stepped on. In wilder parts of the garden there would be

clumps of pot marjoram, *Origanum vulgare*. The white-flowered form, to my taste, is more elegant than the pink. Sweet marjoram, *Origanum Marjorana*, is not as pretty but is more strongly fragrant. It has to be treated as an annual in the North. There would be sage, *Salvia officinalis*, handsome with grey puckery leaves and in July with spires of blue, white or pink blooms. Clary sage, *Salvia Sclarea*, adds to the beauty of a flower border with its virile looking humpy, hairy leaves and tall spires of bloom, or rather of conspicuous floral bracts, iridescent with pink-blue tones.

There are many relatives of the herbs which have not been put to practical use, yet have fragrant flowers and foliage and are attractive looking and an addition to the Garden of Sweet Perfume. Among them are other sages. *Salvia patens*, from the mountains of Mexico, is a half hardy perennial in cold climates and the roots have to be stored indoors over the winter. The flowers are large and of an exquisite pale blue. Also from Mexico, perennial and not hardy north of Virginia is pineapple sage, *Salvia rutilans*, with leaves fragrant of pine apple and with brilliant scarlet flowers which bloom when the days are short. From Asia Minor comes *Salvia azurea grandiflora* with narrow leaves and flowers of "dull violet blue" crowded into whorls on violet-shaded stems. It, too, is perennial but can be treated as an annual in cold climates, since it grows fast and flowers the first season. A sturdy perennial is *pratensis* with blue- or rose-colored flowers on stems two feet high, blooming in June and, if the stems are cut back, repeating in September. *Przewalski* and *virgata* are similar to *pratensis* but much coarser and more shrubby. A biennial salvia very like *Sclarea* is *argentea* with leaves so hairy



Margaret DeM. Brown

Salvia sclarea

as to be quite grey and spires of small white flowers made conspicuous because of large silvery bracts subtending them. *Salvia Horminum* is a satisfactory annual for the fragrant garden, its flowering spikes terminate in tufts of dark blue or bright pink leaflets. The plant is much branched, has fragrant foliage, grows eighteen inches high and self-sows from year to year.

The grey-leaved mint, *Mentha rotundifolia argentea*, has decorative woolly grey leaves, spikes of pale-violet flowers and emits a fragrance of mint when it is touched.

Lavandula Spica is a herb properly speaking, yet many forms of it are so decorative they embellish the borders. It has two relatives, little known in gardens and not hardy in the North. One is *Lavandula dentata*, a handsome low shrub with hairy stems and leaves which are dentate. The flowers grow

in spikes which are topped with white bracts tinted lavender. The spikes are numerous, borne at the tips of stems standing up straight and bloom all summer and when the plant is potted and brought indoors continues to flower all winter. *Lavandula multifida* is not as sturdy, at least with me, as *dentata*, has doubly pinnate leaves and the flowering spike borne at the termination of a long naked stem. A few florets open at a time and the spike is made up of four rows of blossoms, one dovetailing into the next and twists spirally. Both leaves and flowers smell slightly of kerosene with an unpleasant dash of gasoline. Hardly a poetic aroma.

One seldom thinks of onions as ornaments; yet they are most attractive and bloom in mid-summer. Some of them have flowery scents but only until they are touched when the characteristic smell associated with fine cooking is

emitted. The flowers of *Allium flavum* are redolent of lily-of-the-valley. *Allium flavum* is dainty and bears clusters of tiny yellow bells on stalks of different lengths which hang down, or stand up with the still unopened buds among them and all together look like a wind-blown fountain. Very like it, equally pretty and blooming at the same time, is *pulchellum* with flowers of roseate lavender—"Mallow-purple" shaded "Phlox-purple"—on darker stalks with the effect of a dusty Victorian and light colored plum. The flowers are scentless. *Allium odorum* has greyish white balls of flowers topping stems fourteen inches or more high and smells of heliotrope—but only until it is touched. The whole plant of *caeruleum* looks steel-blue and the flowers in clusters are "greyish-violet-blue" but it smells strongly of onion.

The nepetas are stars of the fragrant garden. The scent of their foliage sometimes has a sour quality but more frequently is a pleasant blend of mint and pennyroyal. *Nepeta Mussini* is the best known of the family, has recumbent stems, greyish leaves and violet-blue flowers in scattered panicles. Very like it is *melissaeafolia* with furry grey leaves and loose spikes of bloom. *Nepeta macrantha* and its variety André Chaudron have crisp leaves with humpy surfaces and flowers the color of some violet irises, borne in elongated panicles, so striking and so much larger than in other nepetas that at first glance they look like penstemons. Attractive in early summer but soon growing too rampant is *grandiflora*, unless it is cut back, when it continues to produce grey branches with greyish leaves and blue flowers. Upright stems characterize *Nepeta nervosa* which has terminal conical inflorescences composed of crowded whorls of violet-blue flowers which bloom all summer long.

A little plant very like savory is *Mi-*

cromeria rupestris. It has somewhat recumbent stems, makes a shrubby, but small plant and has dark green obovate leaves three-eighths of an inches long, fragrant of pennyroyal. The flowers are tiny, white, labiate and sprinkle the plant as with snow when in bloom.

From the usual collection of flowers the most fragrant could be brought into the Garden of Sweet Perfume. The season would begin with snowdrops, crocuses, violets and the exceedingly fragrant species narcissi. Later in the season, Scotch or grass pinks would form cascades of pink, white or red bloom on glaucous stems along the borders, and in the back would be clumps of *Phlox paniculata*, their trusses of colored flowers exhaling a delicious scent especially noticeable in the evening. In the corners, where their flowers would gladden the eye and their foliage stand straight and stiff in pleasing contrast to the spreading Labiatae, would be some of the fragrant iris and alongside of them the low early blooming hemerocallis. Behind them would be clumps of fragrant lilies. The scent is sweet in *speciosum*, *formosanum* and *Henryi*, very strong in *regale* and positively headache-inducing in *auratum*.

To fill in the inevitable spaces there would be fragrant annuals. Heliotrope, mignonette, erysimum, sweet alyssum, *Martynia fragrans*, stocks and calendulas. Sweet peas make a beautiful hedge in cool countries where the nights are long as in Scotland, Ireland or Maine. Nicotianas are fragrant at night but like a little shade.

The plants chosen for their fragrant leaves or flowers are not always as gay or brilliant as the scentless plants but no matter how a plant may shimmer with iridescent color or how gracefully bear its exquisite form, when it lacks fragrance it also lacks the poetry possessed by many a humble thyme or violet.

The Illusive Ivy-VI

ALFRED BATES

BECAUSE of the long period which has elapsed since the July 1934 issue of this magazine in which the question was raised as to just what amount of authority could be accredited to Shirley Hibberd by students of the genus *Hedera*, it will be well to recall that the writer had concluded that Hibberd's book should not be taken too seriously. That this conclusion was justified is proven by the following extract from a letter written by the late Leonard Barron to the editor of this magazine. Under the date of November 23, 1934, Mr. Barron wrote: "I have been getting a great kick out of the Ivy discussions and, particularly, in the July number—a tremendous amount of attention is given to Shirley Hibberd. I knew that man pretty intimately in his later years. Our families were quite intimate; in fact, my sister was out to a banquet with him the night he died and his little daughter was living with us at the time. Hibberd was an amazing character and one fact that has been overlooked is that fundamentally he was a hilarious humorist. He had an extraordinary career. His origin no one knew—not even myself. He got into journalism in a north London suburban newspaper and dabbled in second-hand books.

"He was, essentially, a journalist and not much else and I imagine that if he conceived the solemnity with which he is treated by Mr. Bates that even in his grave he would be exploding with hilarious laughter. Mind you, he was honest in his way and I imagine that his attempt at the Ivies was a perfectly simple, honest effort—to just give some identification tags to a group of plants that interested him and concerning

which he had run into a lot of trouble. Scientific? Oh, dear, no! Hardly realized what the word meant. He had a florist's sympathies and was a great entertainer on the lecture platform. He loved to play with an audience. I remember him on one occasion asking me, at a meeting in which I was interested, 'Leonard, what shall I do tonight—shall I make them cry or roll off their seats with laughing?' and he could accomplish whichever thing he started out for. He was a lonesome kind of a character; for many years secretly nursing an invalid wife in his home in Stoke, Newington, England, until she died. I don't believe that anybody ever entered that house—I mean of the gardening people. Then, he moved to Kew and used to visit my father two or three times a week.

"His amiability, affability, his entertaining personality and the humorlessness with which he took things in general, endeared him greatly to the gardening craft of the day. When he died a testimonial to his memory was raised by popular subscription as a benefice to the daughter. I was a trustee of that fund.

"Hibberd knew no other language but English. French, German, Latin, Greek, were absolutely closed with him. I remember Botting Hemsley remarking to me on one occasion that it was evident, from Hibberd's writings, he could not understand any other language—other than English.

"I think that Mr. Bates' summation that Hibberd's Ivy must be relegated to the prettily illustrated parlor books would be in exact consonance with Hibberd's own ideas. He wrote a lot of nonsense consistently. One was

called 'The Silver Gate with Golden Steps and Patches of Tinsel round about,' a book of nonsense stories that he wrote in his late years in the hope that his then infant daughter (by a second wife) might have something to remember the humor that was in her father because he knew he would never live long enough to, himself, tell her all the funny stories he wanted to. That is not hearsay, it is exactly what Hibberd told me himself.

"It is quite true that Hibberd was, to some extent, vainglorious. He, himself, delighted in his acting capabilities. I could tell you about a very curious story about him;—as a satirist and humorist, but the biggest joke of all is that anybody should really take him serious.

"Yours faithfully,

"LEONARD BARRON."

But Hibberd cannot be dismissed as easily as that because botanists who have worked with the genus have given him a greater authority than he deserves. Nicholson (1885) did good work in returning to many of the earlier names which Hibberd had so confused and also cited the Hibberd names and figures in many cases. Rehder seems to accept him without question. Bean follows him in only a few cases. But Tobler accepts him completely as far as text is concerned although in many cases he returns to earlier names and lists Hibberd's as synonyms BUT does not question Hibberd's use of synonyms; this point will be taken up later.

For this reason it has seemed advisable to go through all available garden and botanical literature in order to establish priority of nomenclature and also to obtain the earliest description wherever possible. This has been a long and tiresome task and, so far as

clear descriptions are concerned, the results have not produced as much definite evidence as was hoped for. Before listing the material searched through it will be well to give a final analysis of Hibberd.

The large majority of his names cannot stand under the strict adherence to the rule of priority; how closely we should follow this rule is a question to be decided later. His use of the word synonym is altogether misleading for he quite definitely states that the names listed as synonyms were names under which he obtained the various plants and at no time does he say that he made any effort to eliminate any such mistakes. His method in this would be comparable to a person, who had ordered the roses "La France," "Pink Dawn" and "Briarcliff" and had received "Radiance" for each, maintaining that "Radiance" was a synonym for the three.

Then too we cannot, in every case, even depend upon his descriptions for sometimes they do not agree with the figure cited; such cases will be dealt with later on in the series when that particular form is under discussion. This brings us to the question of the accuracy of the drawings; Hibberd says that the artist "has faithfully rendered" several of them—that is in several of the descriptions he uses this phrase but he at no time gives a sweeping credit to the artist; but that I consider an idiosyncrasy peculiar to the author. I wish to go on record as considering the drawings excellently done and faithfully drawn, as far as they go. But there is a suspicion in my mind that the leaves chosen were not always typical of the general character of the form but were sometimes selected to illustrate Hibberd's idea of what the leaf-form should be in order to conform with his nomenclature.

Yet in spite of all this we should be grateful to the man for having gathered together the list of names and placed them in some sort of order under somewhat typical leaf shapes (when "synonyms" are repeated they often give us a clue if we will carefully dig it out) and for the many clear descriptions. Perhaps when he sluffs over a description we may take it to mean that he is not sure of himself; usually such cases are where odd types are being dealt with or in some of the variegated forms that really merge into each other. And we must always be very grateful to the artist, the longer I study the book the more highly I value his work; there was a time when I considered his yellows "poetic license" but I have since seen a yellow, and a healthy plant, fully as deep in color as his deepest.

In the search through botanical and horticultural literature it was deemed advisable to carry it through the year 1873, one year later than the publication of the Hibberd book, in order to cover all controversy over his changes. It was surprising to find that there was hardly any controversy; the book was almost ignored. This was probably due to the fact that Hibberd had given to the public his list of "new names" in the 1870 issue of *The Garden Oracle* which was a sort of gardeners' almanac edited by himself; and the controversy had died down by the time the book was published.

As before stated, the results of this search has been disappointing; first, in that very few additional names were added to those given in the Hibberd book, and second, in that such descriptions as were given were scant and often very inadequate. The fullest and best descriptions being those given by William Paul in 1867 and repeated by Dr. Karl Koch; see July, 1934 issue of this magazine for full discussion of

same. As this list was compiled by an English nurseryman and checked by a German botanist, presumably after examination of the plants, I am considering it to be of better standing than the innovations of Hibberd and so accept these names in all cases. Whether or not these long Latinized names should be used today is not the question before us now; what concerns us is to get back to the original name and build up from that point. Therefore in the list of names which follows we will not be involved with descriptions but will give names and earliest dates only. What we consider each name to stand for will be taken up in future articles when the forms of the different species are discussed.

LIST OF PUBLICATIONS CONSULTED

Should any reader have access to any publications not here listed and find in same any ivy names not included in my list I would welcome such additional information. French and German publications were not consulted because the writer's knowledge of both languages is as inadequate as Hibberd's was. When references were found to such Mr. B. Y. Morrison has kindly supplied me with translations of same.

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A Systematic Arrangement of British Plants, Wm. Withering, 4th edition—1801

Handbook of British Flora, Geo. Bentham—1865
 Florigraphia Britannica, Richard Deakin—1857
 Beautiful Leaved Plants, E. J. Lowe & W. Howard—1864
 New & Rare Beautiful Leaved Plants, Shirley Hibberd—1870
 Arboretum et Fruticetum Britannicum, J. C. Loudon—1838
 Journal of Botany—1863-1873
 The Gardener—1867-1870
 The Garden—1871-1873
 The Floral World & Garden Guide—1858-1873
 The Florist and Fruitist—1848-1867
 The Florist and Pomologist—1868-1873
 The Garden Oracle—1866-1873
 Gardeners' Magazine of Botany—1850-1851
 Gardeners' Weekly Magazine—1860-1873
 Sowerby's English Botany, 3rd edition—1873
 The British Flower Garden—1823-1838
 The Botanical Register—1815-1847
 The Floricultural Cabinet—1833-1859
 The Floral Magazine—1861-1870
 The Florists' Journal—1840-1848
 The Floricultural Magazine—1836-1841
 The Gardener's Gazette—1839-1842
 The Gardeners' & Foresters' Record—1833-1836
 The Cottage Gardener—1849-1873
 The Midland Florist & Suburban Horticulturist—1847-1861

All publications listed above are English. It is to be regretted that no catalogs were available. As most of these names are for varieties and forms it is logical to suppose they would appear in catalogs more than in garden or botanical publications unless of very marked characteristics. This is proven by Tobler who was able to use old catalogs of Haage & Schmidt in his check list of

1927 and so give earlier dates for names than those found in botanical or horticultural literature.

LIST OF NAMES

As in this list we are concerned with priority of name *only*, varieties and forms of different species will not be placed under their respective species; these will be dealt with later on after the nomenclature has been simplified.

The names of species are printed in heavy face type; all species in cultivation at present had been named prior to 1873.

Names in good standing are printed in italics. First reference is given in brackets following the name; in many cases I have availed myself of Tobler's check-list of 1927 and used the Haage & Schmidt date as this proved the name to have been in use prior to Hibberd's change.

Names which are not in good standing or are synonyms are enclosed in parentheses with reference to the correct name.

There remain some names which I regard as questionable; in that it seems to me that Hibberd took leaf-forms and gave them names before that form was definitely established as a plant and he also made forms of minor points of variegation which are not constant. Such names are listed with a question mark after them and must remain in the questionable class until plants can be found which will fulfill his description.

Many of his "arborescent" forms are also questionable; to such an extent that I feel justified in omitting them from this list. All arborescent forms are merely mature growth of a species, a variety or a form and as such are not entitled to a separate name but should be designated in some such manner: *Hedera Helix*, arborescent; or *H. H. var. Cavendishii*, arborescent. It is true that this is going to cause compli-

cations because we will need to be positive of the juvenile stage and may also give us some long and awkward names but at present I can see no other way to handle the nomenclature of the mature stage. And even as I write this I realize that another factor may enter in; that a wholly green "tree" ivy may take upon itself the desire to become variegated or yellow or white and so complicate the scheme; I have recently seen an ordinary green "tree" ivy become wholly golden when planted in the sun. But we must draw the line from which we will begin to work somewhere and I am arbitrarily excluding all names of mature stages from the following list.

LIST OF NAMES THROUGH 1873

algeriensis (Haage & Schmidt, 1862)
(*algeriensis* foliis variegata—see *cane-scens*)

algeriensis variegata (Wm. Paul, 1867;
not in Hibberd)

(*angularis*—?)

(*argentea elegans*—?)

(*argentea rubra*—see *Cullisii*)

(*aurea maculata*—see *pallida*)

(*aurea spectabilis* much confused by
Hibberd; there is now a form in good
standing called *spectabilis aurea*)

canariensis Willdenow, 1808.

var. *aureo maculata* (Wm. Paul,
1867)

var. (*aurea marmorata*—see "chrysophylla")

var. *foliis aurcis* (Wm. Paul, 1867)

var. *latifolia maculata* (Wm. Paul,
1867)

var. *nova* (Wm. Paul, 1867)

cane-scens (Hibberd, 1870)

Cavendishii (Wm. Paul, 1867)

(*chrysophylla* used for so many "synonyms" that it is meaningless)

(*chrysophylla palmata*—see *palmata aurea*)

(*cinerea*—see the species *nepalensis*)

colchica—Koch, 1859

var. *dentata* (Haage & Schmidt,
1869)

var. (*purpurea*—?)

conglomerata (*Gardeners' Chronicle*,
1871; p. 744)

contracta (Hibberd, 1870)

cordata (No record save that Hibberd
uses it as "synonym" for his "*scuti-
folia*")

(*cordifolia*—see the species *colchica*)

(*coriacea*—see the species *colchica*)

crenata (Wm. Paul, 1867)

Cullisii (Hibberd, in *Floral World*,
1864)

(*cuspidata minor*—?)

decalbata (Hibberd, 1872)

deltoidea (Hibberd, 1872)

digitata (Loudon, 1838)

digitata aurea (Hibberd, one of the
"synonyms" of his "*chrysophylla*")

digitata nova (Wm. Paul, 1867)

(*discolor*—see *minor marmorata*)

doncrailensis (Haage & Schmidt, 1867)

doncrailensis minor (Wm. Paul, 1867)

(*elegantissima*—see *Cullisii*)

foliis argenteis (Loudon, 1838)

foliis aurcis (Loudon, 1838)

Glymii (Wm. Paul, 1867)

gracilis (Hibberd, 1864)

(*grandiflora*—see the species *canariensis*)

Helix—Linnaeus, 1753

heterophylla (Hibberd, 1870)

hibernica (Haage & Schmidt, 1862)

Hodgensii (Mackay, 1836)

incisa (Prior to 1872 as Hibberd uses
it as a "synonym")

(*japonica* and combinations of same
should be ignored as meaningless;
Japanese and japonica were applied
very loosely at that period)

(*latifolia elegans*—see *Cullisii*)

latifolia maculata (Wm. Paul, 1867)

lobata (Hibberd, 1864)

lobata major (Hibberd, 1870; is he
simply adding to the above?)

(*lobata taurica*—? a Hibberd "synonym")

lucida (Hibberd, 1870)
(luteola—?)
maculata (Hibberd, 1870)
maderensis (Koch, 1870)
marginata—? (Hibberd, 1872)
marginata argentea (Wm. Paul, 1867)
(marginata aurea—? Hibberd, 1872)

NOTE: these *marginata* forms are so badly mixed by both Paul and Hibberd that with the exceptions of *Cavendishii* and *Cullisii* it is almost hopeless to try to get at the correct names. Size of leaf seemed to be the determining factor; and soil conditions govern that. I very much fear that most of them are now lost to cultivation.

(marginata canescens—see canescens)
marginata elegans (Hibberd, 1864)
(marginata elegantissima—see Cullisii)
(marginata grandis—see marginata robusta)
(marginata latifolia—? Hibberd, 1864)
marginata major (Hibberd, 1864)
(marginata minor—see Cavendishii)
(marginata pulchella—see Cullisii)
marginata robusta (Hibberd, 1864)
(marginata rubra—see Cullisii)
marmorata (Hibberd, 1864)

(minima—Hibberd's name for several quite different forms; as taurica, doneraillensis, pennsylvanica and so cannot stand. I feel we have the right to use this name for the plant now known as minima; but I have been unable to find when it was introduced.)

minor (Hibberd, 1870)
minor marmorata (Wm. Paul, 1867)
(minor marmorata elegans—Hibberd, 1864)
nebulosa—? (Hibberd, 1872)
nepalensis—Kock, 1853
nigra (Hibberd, 1870)
pallida (Hibberd, 1870)
palmata (Hibberd, 1864)
palinata aurea (Hibberd, 1864)
pedata (Hibberd, 1870)
(pellucida—? Hibberd, 1872)
(pennsylvanica—? Hibberd, 1864)

pustulata—? (Hibberd, 1872)
rhombica—Siebold & Zuccarini, 1846
rhombica variegata (Wm. Paul, 1867)
(Roegneriana—see the species chilica)
rugosa—? (Hibberd, 1870)
sagittifolia (Hibberd, 1864)
(scutifolia—see cordata)
(sub-marginata—see rhombica variegata)
succinata—? (Hibberd, 1872)
taurica (Hibberd, 1864)
(tortuosa—see Glymii)
(tricolor—see marginata robusta and Cullisii)
triloba (Hibberd, 1870)
(viridis—see algeriensis)

Attention should be called to the fact that the name Hibberd or Paul after an ivy name does not mean that either man is responsible for that name but means that the earliest record of the name was found in their respective lists of the dates given. These lists are as follows.

Hibberd, 1864. A list appearing in *The Floral World* and *Garden Guide* of 1864 consisting of fifty-two names with rather full descriptions.

Wm. Paul, 1867. A list appearing in *The Gardeners' Chronicle* of 1867 consisting of forty names with brief descriptions. This list was later repeated by Dr. Karl Koch in *The Hamburger Garten—und Blumenzeitung* of 1868, evidently after he had checked it. As many of the names are already listed in the 1864 list of Hibberd's they are not repeated above.

Hibberd, 1870. A list appearing in *The Garden Oracle* for 1870. In this list Hibberd made most of the changes which he two years later gave in his book.

Hibberd, 1872. Some few new changes which did not appear in the *Garden Oracle* list and were given for the first time.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

CORNELL ROCK GARDENING STUDIES

ONE OF the first colleges to initiate a comprehensive experimental program dealing with some of the more important rock gardening problems was Cornell University. Work has been in progress there for about four years. One unit used in this research program is the Cornell Rock Garden, located on the University Campus. It has a natural stream flowing through it over falls and cascades. The many existing rock outcrops have been supplemented by harmonious artificial ones. Exposure and moisture conditions are varied: part of the garden is shaded by mature trees, the rest is open to the sun; soil moisture is high in some sections, low in others. Although the beauty of this garden attracts increasing numbers of visitors each year, it is not maintained for display purposes alone. It is primarily a trial garden where plants can be tested under conditions the same as those found in private gardens. Other units of equipment include a greenhouse, coldframes, and outdoor beds at the Cornell Test Gardens, a mile from the Campus. The greenhouse is used for propagating work and for growing the plants until they are large enough to be planted outdoors. Experimental work demanding accurately controlled conditions is carried on there. Plants not grown in the rock garden and greenhouse are in outdoor beds where data can be readily taken. There are over eighteen hundred species and varieties of rock garden plants in the Cornell collection this year.

Particular stress is being placed on rock garden plant propagation. Tests

have been made to determine the relative value of different rooting media for cuttings. It was found that for most of the plants tested the alkaline sand and gravel locally available gave poorer results than quartz sand and gravel or washed cinders composed of the same sized particles. Cuttings often rooted more rapidly in the cinders and, in most cases, produced better root systems than in the quartz material. Media made up of particles about the size of rice grains and containing peat moss, one third by volume, gave better results than the finer material.

Early in the work at Cornell difficulty arose in germinating the seeds of many rock garden plants and in keeping the tiny seedlings from damping off. The usual, widely recommended methods of seed sowing were tried and found unsatisfactory. A new seed pot was developed and tested. It has proved its superiority by the several hundred kinds of seeds which have been successfully germinated and grown in it. This seed pot was fully described by M. A. Nagler in the November, 1938, issue of *Gardeners' Chronicle of America*.

The cultural requirements of rock garden plants are being intensively investigated. Data are taken on their growth under different exposures, and under different soil nutrient, moisture, and aeration conditions. Winter hardiness and drought resistance are also noted. One point concerning the requirements of these plants stands out clearly. The majority do not require special soils to grow well. This is contrary to popular opinion, but it has been demonstrated many times. For



Warren C. Wilson

Plants in the Cornell Rock Garden

example, a mixture of two parts loam and one part peat moss is used successfully for general potting purposes in the greenhouse. This mixture is approximately neutral in reaction; ground limestone is added for those plants needing alkaline conditions, sulphur or iron sulphate for those requiring an acid reaction. Most ericaceous plants and certain others are given an acid mixture containing a greater proportion of organic matter. Another specialized phase of the cultural requirement studies deals with native American plants suitable for rock gardens. Particular attention is being paid to both eastern and western alpinines. Collecting

trips have been taken to observe these plants under natural conditions and to bring back specimens.**

Horticultural qualities and uses of rock garden plants are being studied simultaneously with their cultural requirements. Data are taken on time and showiness of bloom, attractiveness of foliage, habit of growth and other pertinent factors. This information will make possible definite recommendations for the use of these plants in the garden.

**For accounts of these trips see: "Collecting Western Alpines by Air" and "Collecting Alpines in the Shickshocks," by the author, in the April, 1938, and April, 1939, issues, respectively, of this magazine.



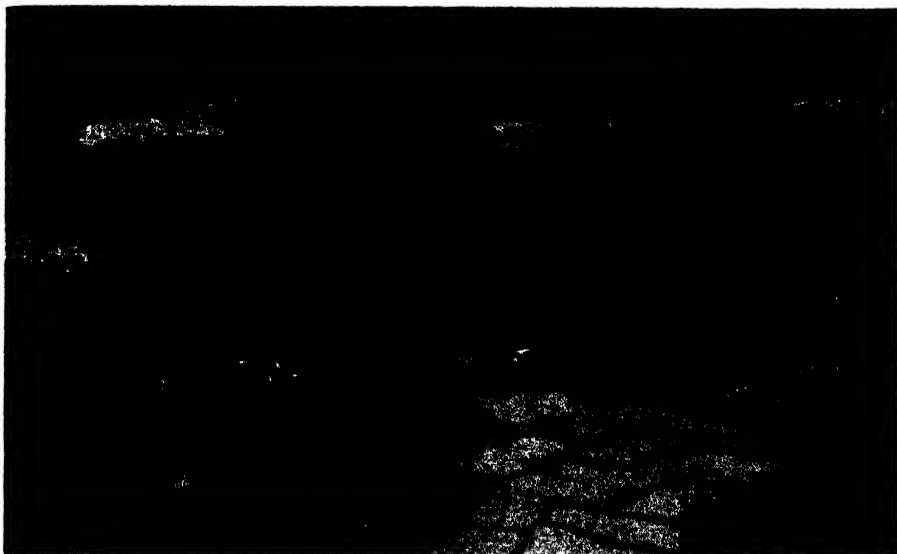
Warren C. Wilson

Central Part of Cornell Rock Garden

In much of the Cornell Rock Garden the soil and rocks are almost covered by mat forming plants. This ground cover principle is only beginning to be used by rock gardeners. It has several advantages over the older method of using plants as specimens and in small groups. A pleasing effect is created by the flowers and year around cover of foliage. Individual specimens and small colonies of taller plants, when properly located, blend well with the low growing plants. There are also practical advantages—washing of the soil and weed invasion are largely prevented and resistance to heaving by frost and to sum-

mer drought are somewhat increased. A ground cover experiment is under way in outdoor beds where some fifty kinds of rock garden plants, most of which are not ordinarily used as ground covers, are being tested.

The nomenclature of rock garden plants is receiving particular attention. An essential part of correctly naming the plants is keeping them labelled at all times. Since the names under which the plants or seeds are received cannot be relied on, each kind is assigned a key as soon as it arrives. This key, through the use of letters denotes its source, and through numbers its nu-



Warren C. Wilson

In the Cornell Rock Garden

merical order of reception from each source. Records are kept of the assigned keys and names under which the plants are received. Each kind of living plant, and pressed specimens, photographs, and slides of it bear its key. Specimens with their attached keys are submitted to the Bailey Hortorium, a part of the university devoted mainly to the taxonomic study of cultivated plants. As rapidly as correct names are determined, they are applied by use of the keys to the proper plants.

Of course, the object of the research on rock gardening is to gather reliable information and then release it to gar-

deners. Lectures and radio talks on the subject are given and some material has been published. A preliminary mimeographed list, *Perennials for Rock Gardens and Similar Situations*, by M. A. Nagler, describes some of the more desirable plants for eastern rock gardens. A printed bulletin, *The Rock Garden*, by Henry T. Skinner, discusses rock garden construction in detail. These publications are available on request. Additional information will be released as rapidly as accurate data are collected.

WARREN C. WILSON

Ithaca, N. Y.



'Rhododendron Dell'

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Notes on Rhododendron Species at the University of California

THE University of California Botanical Garden is fortunate in being located in a climate ideally suited to the needs of a wide range of plant material. Within the garden may be found cacti from the arid deserts of Mexico growing within a stone's throw of rhododendrons from the moist forests of the Himalayas, or rare and beautiful bulbous genera from the Peruvian Andes thriving in an area where one may also see the curious stonelike *Placiospilos* and other mimicry plants from the South African veldt—all growing out of doors the year around! The Director of this Botanical Garden, Professor T. H. Goodspeed, has built up in the relatively short period of 10 years an extremely varied and interesting selection of genera and species which cause ever increasing comment from plant lovers in California. One of the more interesting plant groups in the Garden is the rhododendron collection. As a matter of fact, one could almost say that the Rhododendron Dell is the heart of the Garden since its display in Springtime always brings the Garden forcibly to the attention of the public.

In 1927 there was purchased for the Botanical Garden a collection of rhododendrons brought together by a local nurseryman who had made a specialty of the genus. It originally comprised some 100 species and a number of hybrids. Many of the plants were fairly large, but the majority had not yet attained flowering size. Since that time an additional 150 species have been propagated by the Botanical Garden from seed, and the collection as it now

stands is possibly one of the largest outdoor representations of the genus in the United States. During the last two years a great many of these species have bloomed and the following notes record our observations on the behaviour of our flowering sized specimens. The additional 150 species were grown from seed collected by the University of California Botanical Expedition to Western China and Tibet in 1932, and also from seed contributed by the Royal Botanic Gardens at Edinburgh and Kew. The majority of rhododendron species seem to take kindly to our Berkeley climate although certain precautionary measures are used to prevent damage by freezing temperatures which sometimes occur in December and January, or by long, dry periods in the late summer and fall. Since the collection has been acquired, there have been two winters when the thermometer registered as low as 15 degrees below freezing point. Such temperatures are of course unusual in Berkeley, but luckily they were anticipated and pine boughs were cut and placed around and through all species reputedly tender. With the exception of one or two, such as *R. diaprepes* and *R. Maddenii*, where barksplit occurred, relatively little damage was done. During the months of September and October, the humidity is at its lowest and when hot dry winds are blowing, as they often do at that time of year, the atmosphere around the plants is kept moist by overhead sprinkling night and morning. A careful check is also kept so that the plants do not dry out; other-

wise, species that come from the moist forest regions of the Himalayas are liable to have their leaves scorched. From May to December there are no rains to speak of, but occasionally there is some precipitation from sea born fogs. This means that irrigation must be resorted to during the dry months and, while our overhead sprinkling system obviates, to some extent, the necessity of watering, individual inspection of the larger specimens is carried out at regular intervals to ensure the proper moisture conditions at the roots.

The collection is grouped under the shade of a grove of native evergreen oaks (*Quercus agrifolia*). The shade cast by this grove is augmented by plantings of *Pinus* spp. and where plant requirements demand deciduous shade and more light, birches, maples, and flowering cherries are used with good effect. The soil has a sandstone origin with a pH value of 6.5 to 7.0. In the *Rhododendron* Dell, however, there is a preponderance of heavy, black, retentive soil which has been lightened to some extent by frequent applications of peat and sand. The continual applications of decayed pine needles in the form of mulch has aided greatly in making the soil more friable and, incidentally, in lowering its pH value.

The following notes have been made principally while working with the collection at the Botanical Garden in Berkeley but where occasion warrants reference will be made to species not at present grown at Berkeley, but which were observed at the Royal Botanic Garden in Edinburgh and in Golden Gate Park in San Francisco. The species will be dealt with according to series. A "series," in this case, denotes an aggregation of nearly related species grouped around an outstanding member of the genus. This system of classification is used by the Rhododen-

dron Association of Great Britain and readers who require more botanical information are referred to this Association's publication entitled "The Species of *Rhododendron*."

Arboreum Series

The members of this series are mostly large shrubs or small trees and require several years to attain flowering size when grown from seed. A mature specimen plant of *R. arboreum* or *R. Dclavayi* is certainly worth waiting for, however, and is a valuable acquisition to the garden where there is sufficient shade and enough space to set the plant off to best advantage. Specimens of *R. arboreum* here are now six to eight feet high. One plant has bloomed in April for the past two years and its great brilliance gives promise of a glorious show in years to come when it has reached a more mature flowering condition. The truss was compact and well formed, the individual flowers were tubular, of good texture, and lasted fully two weeks, the color a brilliant scarlet. *R. Dclavayi*, considered by authorities to be the Chinese equivalent of the Himalayan *R. arboreum*, flowers at an earlier age and is also very desirable. Ten-to twelve-year-old specimens are now six feet high and their scarlet trusses make a striking effect in March. *R. Dclavayi* is hardly divisible from *R. arboreum* by any one character except that in habit it is not so arborescent and that it is more susceptible to barksplit in cold weather than the latter. In four years from seed *R. arboreum* subsp. *Kingianum* has formed a sturdy bush four feet high and three feet through. The foliage is handsome, more so than that of the type, the leaves being more rounded and the veins very deeply impressed. So far it has not bloomed but gives promise of a handsome shrub for the woodland. The flower truss is said to

be similar to *R. arboreum* in shape and color. Specimens of *R. argyrophyllum* are still quite small and no flowers have been formed. The illustration of *R. argyrophyllum* var. *leiandrum* will give some idea of its type, truss not so compact as *R. arboreum*, color white flushed rose. *R. insigne* is very slow growing. Ten-year-old plants are now only four feet high with no sign of a flower bud yet, but we are looking forward to its first bloom with a great deal of anticipation since specimens seen in Great Britain were attractive plants up to twelve feet high and with large pinkish trusses. *R. Ririci* bloomed last year for the first time and has proven hardier than *R. arboreum* although the color is not so striking. The truss which opened in late February was large, fairly compact, and a good shade of purple. It is unfortunate that this species is not what one might call floriferous since it rarely produces a mass of bloom. Members of the *Arboreum* series, grouped under the live oaks, seem happiest in a deep leaf soil where there is an abundance of moisture without stagnation. Since the majority of *Arboreums* are from the moist forest regions, care is taken to keep the plants moist at the roots so that leaf tip burn will not occur during our hot, dry periods in late summer.

Auriculatum Series

One of the smallest groups within the genus consisting of two well-known and attractive species; namely, *R. auriculatum* and *R. Griersonianum*. The former is very slow growing and, as a rule, does not bloom until it has attained a fair size. Our specimens are only one foot high and we do not expect them to bloom for three or four more years. Plants of *R. auriculatum*, seen in England last July, were in full bloom, and looked very handsome with their large, loose trusses of white blossoms. The

individual flowers were funnel shaped, four inches across, and sweetly scented. I think I am quite safe in saying that *R. Griersonianum* is the most outstanding species in the Garden. Some of its desirable characters, its ease of cultivation, its striking color, and its period of flowering. There are not many flowering shrubs that will flower in four years from seed and yet seed of *R. Griersonianum* sown in the Spring of 1933 has produced vigorous specimens three feet high and three feet through which bloomed last June (1938). Older specimens have thrived exceedingly well on a well drained slope where they have the lacy shade of the birches and the protection of a nearby belt of pines, but no dense overhead shade. With the possible exception of *R. ponticum* they have withstood drought better than any other species in the collection. Toward the end of June buds begin to open when practically all other species have ceased to bloom. The inflorescence is a lax corymb of from five to twelve blossoms. The individual flowers are funnel shaped, about three and one-half inches long and four inches across; the color is best described as bright geranium scarlet and in average weather the flowers last fully two weeks. *R. Griersonianum* with its ally *R. auriculatum* survived a temperature of 17° F. in 1935 with only an interlacing of pine boughs to ward off the cold. Probably the fact that these species were planted on a well drained slope prevented the formation of cold air pockets and also kept the roots free from an excess of moisture. *R. Griersonianum* is being used with great effect as a parent in hybridization and in years to come its admirable characteristics should be apparent in many lovely hybrids.

One of the largest groups within the genus, but unfortunately one of which



David Wilkie

the Botanical Garden has few representatives. It is hoped however that in the near future a larger number of species can be grown since up to now members of this group have taken kindly to our Berkeley conditions. The Arnold Arboretum has been more instrumental than any other institution in the world in classifying this large and difficult group, and readers seeking more information on azaleas are referred to the various publications from this institution. *R. Fasyi*, one of our native eastern azaleas, is an attractive species, easily grown, and in Berkeley does best under the light shade of birches where the plants can receive ample moisture. The flowers are fully an inch across, pale pink, and produced in late April before the leaves have fully expanded. It is only recently that we have flowered *R. arborescens* and the plants are still quite small. The flow-

ers appeared toward the end of May, were pale pink, about two inches wide and pleasantly fragrant. It is rather early to form an opinion concerning this species but judging from older specimens in European gardens I should imagine that it would be of greatest value in a large garden where it could be allotted sufficient space to attain its maximum development. *R. calendulaceum* is the eastern counterpart of the western *R. occidentale* and while it lacks the fragrance of the latter it is much more desirable from an ornamental standpoint. The flowers of our specimens were deep yellow, about two inches across, and appeared in May. During October the leaves turn a brilliant scarlet forming a striking contrast against the papery whiteness of the surrounding birches. Another desirable feature of *R. calendulaceum* is that it will succeed in a comparatively dry

location provided that it has some light shade during our hot, dry summers. *R. molle* is, of course, known to all but its familiarity has by no means made us indifferent to this showy Chinese species. It is a parent of many of our loveliest azalea hybrids; even so, in itself it is worthy of a prominent place in any garden. A form of *R. molle* sent to us from China by Dr. Rock some years ago has produced flowers of a deep orange and its habit seems to be a wee bit more robust than our original plants. *R. occidentale* like *R. molle* has been used with great success in hybridization. Our experience with it might appear something of a paradox since we have better success with the eastern azaleas than we do with our western species. We grow it, of course, after a fashion, but to date we have not succeeded in establishing a well formed specimen. An explanation may, no doubt, lie in the fact that our plants were collected in the wild and, owing to the nature of its root system which is woody and travels quite a distance under ground, it does not recover as quickly as nursery grown stock. As a rule *R. occidentale* blooms in June and if the season is at all dry and warm another crop of blossoms appears in October and November which does not displease us one whit because its fragrant white flowers are always welcome. In 1932 we received seeds of an azalea from the University of California Chinese Expedition which, blooming, proves to be *R. indicum forma*. This species, which is not to be confused with the *Azalea indica* of the trade, is a dense growing shrub with dull green foliage and brick red flowers, not unattractive, and perhaps when the plants are a little older they may have value as a contrast planting with the lighter colors of other species. *R. mucronatum*, often referred to as *Azalea ledifolium*,

is one of our favorites and certainly a worth while plant for gardens where temperatures do not fall much below 20° F. We have forms of this species with pure white flowers and others which are white with rose markings in the throat of the corolla. In exceptional years as many as three distinct crops of blooms are produced—one in May, another in midsummer, and finally a small showing in October. This might be regarded as overproduction and injurious to the plant's welfare but it doesn't seem to retard growth at all. They form low spreading shrubs and are excellent subjects for the foreground of larger plantings. Space does not permit of descriptions of the many *R. obtusum* hybrids but I do think that *R. obtusum* var. *Kaempferi* is worthy of mention in passing. This variety is somewhat eccentric in its growth, shooting off at odd angles occasionally, but this tendency could be overcome by judicious pruning. The leaves are partly persistent and turn a bright red in October. The flowers open in May and require the protection of some deciduous shade or otherwise the salmon red flowers fade rather badly in our strong California sunshine. *R. obtusum* along with its varieties *Kaempferi* and *japonicum* have been used extensively in hybridization. Another desirable species belonging in the same group as *R. obtusum* is *R. Oldhamii* from Formosa which becomes rather a large shrub with yellowish evergreen leaves and brick red flowers. So far this species has not been over floriferous with us. The plants are slow growing and though over ten years of age are not more than three feet in height.

Another evergreen azalea that has played an important role in the development of better types is *R. Simsii*, one of the progenitors of the greenhouse, hybrid "Indian Azaleas," and some-

times erroneously called *R. indicum*. The flowers, which appear in April and May are deep rose red and sometimes are produced in such abundance as completely to conceal the foliage. This is an excellent species for the warmer and more favored localities such as Central and Southern California, and Florida. The more recent hybrids of this species are, of course, a great improvement and should become better known in California gardens. Seed of *R. yedoense* var. *poukhanense* was sent to us by Mr. Gable of Stewartstown, Pennsylvania, in 1934, and we now have plants one foot high and one foot across. The plants are growing well in a semi-shady location and to all appearances will form low growing shrublets. We are hoping to see the fragrant, rose colored flowers this coming spring. If we were to select six of the best azalea

species, *R. Schlippenbachii* would certainly be given first choice. The handsome large pink flowers, about three inches wide appear in May, just about the time that the leaf buds are beginning to break. Older plants are literally covered with blossoms and show to great advantage in an open woodland or to the front of a tree planting where they can enjoy a leafy, moist soil. The foliage in October and November turns from green to crimson and finally to yellow before dropping. One specimen now six feet high and about eight feet through, gives some idea of its ultimate habit, and if you can visualize a mass of bright pink flowers against the light fresh green leaves then you must realize that *R. Schlippenbachii* is worthy of a prominent place in the best of the gardens.

P. H. BRYDON, *Manager*.

Illustrations

Part of the "Rhododendron Dell" in the University of California Botanical Garden. A view from the Azalea Pool showing, in the foreground, plantings of the Irroratum series on either side of the path and in the background, on the left, members of the Arboreum series. Corydalis lutea on the left-hand border of the path.

Rhododendron argyrophyllum var. *leiandrum*, a member of the Arboreum series.
Flowers white flushed rose.

Photograph, David Wilkie, Royal Botanic Garden, Edinburgh

A Book or Two

A Book of Garden Flowers, Margaret McKenny and Edith F. Johnson. The Macmillan Company, New York, 1941. 72 pages, illustrated. \$2.00.

The color plates are from Miss Johnson's paintings; the text from Miss McKenny's facile and pleasant pen. This is a pleasure-book to intrigue the young, to waken memories in the old. The recipient likes to think he can qualify in each group!

Farm Soils, Their Management and Fertilization. Edmund L. Worthen. John Wiley & Sons, Inc., London; Chapman & Hall Ltd., 1941. 515 pages, illustrated. \$2.75. Printed in U. S. A.

This is a reference book with many supplementary references after each chapter. It is written for the farmer as the title indicates, but it is worthy of the serious attention of the home gardener. The publisher may be British, but the materials are based in the United States and from many parts of our country.

Pruning Trees and Shrubs. Ephraim Porter Felt. Orange Judd Publishing Co., New York, 1941. 237 pages, illustrated. \$2.00.

It always pays to see what Dr. Felt has to say, and this book is no exception to that rule. Emphasis is laid on principles and procedure rather than on case histories. If you want to understand pruning you should read it.

The Fragrant Path. Louise Beebe Wilder. The Macmillan Company, New York, reissue, 1941. 407 pages. \$1.00.

Like all of Mrs. Wilder's books, this makes pleasant reading, for it is packed with her store of learning and couched in her charming style. The reissue at a lower price should bring it to many who may have missed it in 1932.

Adventures in a Suburban Garden. Louise Beebe Wilder. The Macmillan Company, New York, reissue, 1941. 250 pages, illustrated. \$1.00.

This was, in its first issue, very largely made up of what Mrs. Wilder had published serially. It is well said and represents the adventure of a person of taste and skill—not really adventurous in the usual connotation of that word but certainly reporting on her trials and assays.

Maintenance of Shade and Ornamental Trees. P. P. Pirone. Oxford University Press, New York, 1941. 422 pages, illustrated. \$4.50.

Too many persons accept trees without much thought after planting and fail to recognize their difficulties until it may be too late. The author brings together here much valuable information in regard to all the things the tree owner should know. To read the book at a sitting may make the problems seem enormous, but one will return again and again for help. A reference work chiefly for the eastern half of the United States.

Science in the Garden. H. Britton Logan and Jean-Marie Putnam, Consultant, Lloyd Cosper. Duel, Sloan & Pearce, Inc., New York, 1941. 255 pages. \$2.50.

As everyone has observed the scientists have been discovering horticulture

for a decade or more but have contented themselves, more or less, in writing for their own circle. Although, as the preface intimates, there has been some lack of mutual understanding and confidence, the scientists have done much that we should know about, even if we do not intend incorporating it in our daily routine. Much of this will not concern us, to repeat, but it is worth reading.

The Gladiolus, 1941. Yearbook of the New England Gladiolus Society, printed for its members. Albin K. Parker, Sec'y., Norwood, Mass. 200 pages, more or less. Illustrated. Supplement, 36 pages.

A typical yearbook from this lively and accomplished group. If you like gladiolus and want to know them, you should have it: if you think you might like them, the same: if you hate them, don't look at it.

The Principles of Vegetable Gardening. Liberty Hyde Bailey. The Macmillan Company, New York, 1941. The Eighteenth Edition, "Re-made and Re-set." 490 pages, illustrated. \$3.75.

Now that the attention turns so keenly once more to vegetable gardening, this should have a renewed popularity. One expects nothing but the best from this distinguished author and usually is satisfied.

The vegetables in all their kinds and forms march through the pages with much of scientific note, homely comment and pertinent advice.

If you are about to raise vegetables seriously here is your first text.

Classification Scheme for a Garden Center Library. Marjorie Bolton Clelland. The Garden Center of Greater Cleveland, Cleveland, Ohio, 1941. \$1.00.

A simple and, I am told, reasonable scheme for numbering books that make up a garden library. With its aid you are supposed to be able to decide whether your new book will wear 83 or 91 on its back. It's a good business and a good scheme, but thank Heaven we aren't a librarian or even a near-librarian.

Who's Zoo in the Garden? Charles Palmer, Jean-Marie Putnam, Lynette Arouni. The Greystone Press, New York, 1941. 127 pages, illustrated. \$1.50.

Prose and verse, pictures, etc., mostly etc. We conclude this is supposed to be funny, witty, gay, scintillating and again etc., but personally we feel it should have perished in one conversational afternoon and never have risked embalming in printers ink. (Of course it's our own jaundiced fault!)

The Gladiolus. Forman T. McLean. Whittlesey House Garden Series, McGraw-Hill Book Co., Inc., New York, 1941. 197 pages, illustrated. \$2.00.

A very pleasant book about a flower that inspired many to their major summer activity. It follows the inevitable pattern of all good plant material books devoted to a single flower and does it very well and readably. Personally we are not converted but being jaundiced it is perhaps fair to add arterio-sclerosis to our other handicaps!

The Gardener's Pocketbook

Passiflora quadrangularis L. [See page 280]

For most persons in the north the word passion-flower suggests an ornamental vine rather than a fruit and it may be that if one lived really in the tropics, one might think of it only as a fruit and not as an ornamental.

If one looks back over old horticultural publications, mostly European, one is forced to the conclusion that while the passifloras were taken home in the hope that they might fruit well, the flowering had to be accepted as the sum of the horticultural return.

The beautiful plate in the Botanical Register (tab. 14) published in 1815 would certainly appear to draw attention to the flowers which are much more brilliantly colored than those in plate 2041 of the Botanical Magazine, published four years later.

Recalling the sudden passion for vines in certain parts of Florida, it may be amusing to quote a portion of Sims' text—"From its quick growth and thick foliage, it is well suited for forming arbors and covered walks but Jacquin observes that they are apt to be infested with venomous serpents who chose the Passion-flowers, more especially this species and the laurel-leaved, for their abode, well knowing that their favorite prey, the squirrels nowhere more abound, these animals being fond of the fruits. *****"

This same note is stressed in the text of the Botanical Register (1.c.).

The latter reference supplies the note that "Jacquin never saw our plant but in a cultivated state. Swartz makes it a native of the woods in the West Indies. Yet neither he nor any other author expressly states the having seen

it or even heard of its being seen, wild. It was cultivated in this country by Phillip Miller in 1760; and it is pretty general in our hot-houses, where it sometimes ripens its fruits. *****"

Edouard Andre, writing in *Revue Horticole* in 1898, and reporting chiefly upon the fruiting of this species out-of-doors at Marseilles, after being twice hand-pollinated by M. Davin, reminds us that the Tacsonias (also known sometimes as Passion flowers) are native to the higher cordilleras but the "passifloras with edible fruits are generally from the more tropical climates. They are chiefly the species: *Passiflora alata*, *P. maliformis*, *P. edulis*, *P. quadrangularis*, *P. ligularis*, *P. laurifolia*, and its variety *linifolia*."

"This last species, known in the Antilles and in the Guianas under the name of 'Pomme liane' and 'Marie Tambour' have large fruits with a delicious perfume."

For *P. quadrangularis*, Andre quotes the common names of "Barbadine" or "Granadilla" or "Parcha." He describes the flowers as "ephemeral" and "fragrant." He then passes on to the discussion of the fruit which apparently is best when made into a marmalade or if eaten fresh, fortified with "rum or madeira or kirsh or white wine" and sugar to taste! M. Davin himself is reported to have used rum and to have decided that the taste "was very agreeable and the perfume like pineapple!"

(In some ways this doctoring recalls to mind the sops of wine added to many an old herbalist's brew!)

Much later notes from England, none of which need concern us, save one small bit from the Garden (vol. 50, p. 313) in which a note signed "South-



H. F. Loomis

Passiflora quadrangularis

ron" ends with the sentence—"It is not, I am quite aware, the natural method of displaying the cut blooms to put them into bowls of water, as if dealing with Water Lilies, but in such a case I consider this mode is quite justified by reason of the beautiful effect that is produced."

In the supplement of the U. S. Department of Agriculture Yearbook for 1937, published as Separate 1589 (pp. 63-64) there is a very brief mention of the passifloras which are grouped under the common name "Granadilla" where scanty attention is paid to any of the species and little more is added save to suggest that nematodes are one of the seriously limiting factors at least for Florida and that a breeding program is under way that it is hoped will produce some individual plants resistant to those attacks.

Meantime, it may be quite enough to treasure the vine for itself, to enjoy its masses of foliage, its wonderfully constructed flowers and its fruits whether eaten, drunken or merely sniffed.

Antholyza revoluta Burman. [See page 282]

This species grows from "Little Namaqualand to Grahamstown, attaining an elevation of two thousand five hundred feet," a region of high temperatures ranging from 56° to 82° F. average high temperatures with relatively lower ranges as one goes to higher elevations but no frosts save at the highest. Rainfall is not great (between 20 and 30 inches) and with the peak during their winter months. This accounts for the persistent habit of the plants in making winter growth here and the need for a cold greenhouse.

Planted in deep pots or flats, the gladiolus-like corms soon push up the slender grasslike foliage, one leaf to the growing axis and later the slender,

indeed often rather weak, flowering shoots topped by the large and brilliant flowers which are natural size in our figure. Unlike the flowers of most species of antholyza in which the flowers seem tubular with relatively small segments, all of which gives the inflorescence a look quite unlike that of the present species. This plant, because of its large flowers with spreading segments, has sometimes been classified as a gladiolus. It carries, however, the usual cylindrical tube that characterizes the flowers of *Antholyza* as compared with the funnel-shape tube of *Gladiolus*.

Just what place this antholyza should take in our horticulture is hard to decide. Each plant by itself is so slight that they must be considered in some quantity if any good effect is to be had. If corms were abundant so that they could be grown for winter cutting, that would be desirable as the flowers last well when cut and their brilliant color makes them very useful in late winter and early spring.

One can not help but wonder what the effect might be, provided the proper area in the United States could be ascertained, if hundreds of corms were planted in a grassy place where other plants might support the uncertain stems. In none of the South African texts available here are there any descriptions of its natural habitat, so there is the chance that this idea is quite erroneous.

Antholyza is one of the genera that has been divided by botanists into many smaller bits. N. E. Brown in the Transactions of the Royal Society of South Africa, vol. XX, p. 261, did the job! One plant, according to him, should now be called *Homoglossum watsonium* N. E. Br. And in addition to that the *Antholyza paniculata* that was illustrated as long ago as October, 1928, must now be called *Curtonus panicula-*



Lillian A. Guernsey

Antholyza revoluta

tus N. E. Br. There are other botanists, however, who do not follow N. E. Brown, so if you care to be a conservative stick to *Antholyza*.

Two Dittanies

The name of Dittany has been applied to at least four plants, belonging to three different genera: *Dictamnus albus*, False or Bastard Dittany, of the Rutaceae; *Lepidium latifolium*, the Broad-leaved Pepperwort or Dittander, of the Cruciferae; and two of the Labiatae, *Cunila mariana*, a small American herb, and *Origanum dictamnus*, the Dittany of Crete, which the old pharmacists called *Dictamnus creticus*. The generic name of the first and the specific name of the last were not given because of any resemblance between the plants, but because both are common near Mt. Dicte in Greece.

The description of the Dittany of Crete given in Woodville's Medical Botany (1794) is sufficiently full:—"Root fibrous, perennial. Stalk about a foot in height, branched, downy, ligneous. Leaves ovate, blunt, opposite, on short footstalks, thick, covered with soft white hairs. Flowers purple, in spikes. Bracts roundish, smooth, colored, numerous, forming quadrangular spikes. Calyx small, five-toothed, concealed by the bracteae. Corolla monopetalous, consisting of a long tube, divided at the limb into two lips, of which the upper is straight, and encloses the filaments: the underlip is cut into three obtuse lobes, of which the middle one is the largest. Filaments two long and two short, filiform, longer than the corolla, and furnished with simple antherae. Germen divided into four parts. Style slender. Stigma bifid. Seeds four, of an irregular ovate shape, and lodged at the bottom of the calyx.—It flowers from June till August."

It is to this plant that a sentence from

More's "Antidote against Atheism" refers:—"Virgil reports of Dittany that the wild goats eat it when they are shot with darts"; which seems to be taken from this passage in the Aeneid, L XII. 411.—

"Hic Venus, indigno nati concussa dolore, Dictamnus genetrix Cretaea carpit ab Ida Puberibus caulem foliis, et flore comantem, Purpureo: non illa feris incognita capris Gramina cum tergo volucres haesere sagittae."

This "Righte Dittany," "sacred herb of Crete," seems to have aroused much interest of late among herb lovers, largely on account of its antiquity, for "Both the Greek and Roman writers have fabled this plant into great celebrity." It was grown in England before 1568, by Mr. Riche, whoever he may have been.

This Dittany is so tender that it must be pot-grown, and in the winter must have very little water and very much sun. A soil of two parts fibrous loam and one part silver sand and leaf-mould suits it, and cuttings taken in spring root readily in sand under a bell-glass in the greenhouse.

"The leaves are very warm and aromatic, of an agreeable smell, and hot biting taste.—Though rarely used at this day, it certainly possesses, in a very considerable degree, the stimulant and aromatic qualities which characterize this class of plants," says Dr. Woodville. Its present use seems to be largely confined to the flavoring of drinks, in its native Candia.

Origanum dictamnus is a "collector's item," but *Dictamnus albus* is well worth growing for its beauty alone, though it has figured in plant lists as Dittany or Fraxinella since the thirteenth or fourteenth centuries. "Whilst I seek for dictamne to recure his scarre"—

A well-grown *Dictamnus* may be four

feet across, and nearly as tall, and will bear from fifty to seventy-five flower spikes. The plant is handsome at all times, its stalks thickly clothed with firm-textured, ash-like leaves, (which account for the common name of *Fraxinella*); and when the ten-to-twelve-inch spikes of white or pink spidery flowers are in full bloom; there are few if any more beautiful plants in the garden. It blooms here in late May or early June, though plants set in different locations will carry the bloom pretty well through the latter month.

It will stand the driest of conditions without drooping a leaf, and has had no pests whatever, of root, or leaf, or flower, in our experience of several years. It doesn't need to be divided every two or three years; in fact, it rather resents disturbance. The leaves, when pinched or brushed against, give forth a rather strong and entirely distinctive odor, about which no two people seem to be agreed. Perhaps one might say that it is a not wholly successful mixture of several scents, all agreeable in themselves.

Dictamnus is easy enough from seed, though slow both as to the germination of the seed and growth of the plant. It self-sows freely, and seeds sown in the fall will germinate in the spring. It may be three or four years before the plant will bloom, but it grows more beautiful every year, at least for several years, and plants have been known to have lived a hundred and fifty years in the same spot.

A lighted match held under the spike of bloom on a hot dry evening will cause a slight flash up through the flowers, whence the other common name of Gas-plant.

Fraxinella also had a number of medical uses. The root in powdered form, or in extract of it, was used as a "stomachic, tonic, alexipharmic," for

destroying worms, in intermittent fevers, for epilepsies, and for some other troubles! But though "undoubtedly a powerful medicine," it had rather fallen into disuse by 1790.

A variety sent to me as *caucasicus* is larger in all its parts than the type. Its flower spikes will reach eighteen inches in height, and the leaves a length of about fourteen inches, as against about twelve and eleven inches respectively in the type.

Personally, I think I prefer the white to the colored variety, but with us it has never seemed so vigorous.

Being herbaceous, the plant dies to the ground in the winter, but all the growing season, its rounding mass of rich dark green leaves is as effective as an evergreen of the same shape and texture would be.

Bailey gives its range as from S. Europe to N. China, adds another common name—Burning-Bush,—and two varieties besides *rubra*, the ordinary pink form;—var. *purpureus*, with dark flowers, and *dahuricus*, a form of the species.

There is still another good point; that it is much beloved of hummingbirds.

Antrim, N. H. RACHAEL COUGHEY

FROM THE MIDWEST HORTICULTURAL SOCIETY

Pinus strobus.

Of the scant half dozen evergreens native to the lower lakes region of the middle west, the most outstanding is the white pine. Occurring in many places as isolated stands the white pine is found in swampy places, and on high bluffs. In central Illinois is the famous White Pines State Park where a magnificent stand of these pines reminds one of a northern forest. Not far away is a fine planting of these pines on the estate of Mr. F. O. Lowden. Several of the cemeteries in and near Chicago

have made good use of these and other pines in creating excellent landscapes.

The white pine (*Pinus strobus*) should be balled and burlapped for transplanting. Given a good soil and plenty of room it will soon develop into one of the finest evergreens for the large or small garden. This is one of the pines that has character and beauty at all periods of its growth and does not undergo the adolescent straggleness of some of the others.

Rosa Harison's Yellow.

A few years ago many nurseries became quite enthusiastic about the Golden Rose of China (*Rosa Hugonis*). While this rose is a beautiful and desirable addition to a garden yet it does not equal the old proven Harison's Yellow in depth of color, flower size, hardiness, or fragrance.

Harison's Yellow is seen at its best in old plantings around farms, in old cemeteries, along roadsides, and in country towns where gardens have been built by the swap method.

As a hardy subject this rose has been known to survive a quarter century or more of absolute neglect. It is not particular as to soil or exposure, but does best in an open situation in a medium soil.

As an early blooming subject for a hedge or as a specimen in the shrub border this rose deserves a re-introduction to our midwestern gardens.

Celtis occidentalis.

On a recent trip to the Field Museum in Chicago I was agreeably surprised to notice a walkaway of hackberry, *Celtis occidentalis*, lining the eastern approach to the building terrace. The striking beauty of these medium-sized trees brought to mind the magnificent specimens in Starved Rock Park near the site of the old lodge. At

first appearance the hackberry might be mistaken for the more common elm. The leaves, however, are longer and thinner in the hackberry and a lighter green. The tree is more spreading than the elm and generally of smaller stature.

The bark of the hackberry is variable. In most plants rows of small protuberances are rather prominent on close inspection. These "warts" are one good means of distinguishing the species. In Starved Rock Park there are many large plants exhibiting this wartiness of the trunk but in others the bark is smooth and gray and greatly reminds one of the bark of the beech.

Another characteristic of the hackberry is the presence of "Witches Brooms" in large plants. These brooms are but numbers of small twigs growing from one locality on a branch and resembling the branches of sticks supposed to compose the brooms of the witches of ancient lore. The "Witches Broom" is caused by insect injury and does little damage to the plant other than causing the formation of numerous twigs at the point of attack by the insect.

As a small to medium tree for the grounds that need something a little different the hackberry is quite useful.

ELDRED E. GREEN.

Double Forms of Our Wild Roses

Our "garden" roses (those with double flowers) have all had their origin in Europe and Asia. While the single wild rose of any land is just as sweet as any cabbage-like fullness, yet fashion today decrees that roses in a formal planting should be double. But this increase in petalage and size of flower has already begun in our native species, though these sorts are as yet little known. By conservative botany our native species are about 21—*R.*

acicularis and forms, *R. arkansana*, *blanda*, *californica*, *carolina* (*humilis*), *foliolosa*, *gymnocarpa*, *macounii*, *minutifolia*, *nitida*, *nutkana*, *oreophila*, *palustris* (*carolina*), *pisocarpa*, *rudiuscula*, *setigera*, *spaldingii*, *stellata*, *suffulta*, *virginiana*, and *woodsii* and var. *fendleri*; and 9 species less known—*R. adenosepala*, *manca*, *melina*, *mohavensis*, *pictorum*, *pyrifera*, *sonomensis*, *spithamea* and *subserulata*. Botanical forms and white-flowered plants are known of many of these, but true doubles are not yet numerous.

Oldest of double American roses is Double Virginia Rose, or Rose d'Amour (*R. virginiana plena*; sold also as *R. rapa*), known before 1768 and introduced to gardens before 1820. The plant has very dark green leaves, very shining and quite smooth both sides. The flowers are the usual rose red of wild roses, of 25 or more petals. The plant may be found wild somewhere between New England and Missouri, particularly in New Jersey and Pennsylvania, but it has been offered by nurserymen. Yet the plant that I purchased last year had the normal single flowers. There has been a plant in the collection of the Arnold Arboretum.

Most showy of double native roses are the doubles of our Meadow Rose (*R. blanda*). The wild plant has very red stems in winter, always nearly without prickles or bristles. The seven leaflets are smooth both sides, but not shiny. Several forms with double flowers are now known, the plant much as the wild form. Oldest is Betty Bland, a hybrid with a HP., put out by F. L. Skinner of Dropmore, Manitoba, in 1930. The flower is of medium size, of 25-30 petals, of a clear pink, blooming in great profusion in June. It is the wild rose greatly glorified. Similar is Lillian Gibson, described in 1938, now to a limited extent offered by the

producer, Dr. N. E. Hansen, at Brookings, S. D. He crossed the wild rose with Red Star, HT. The flowers are quite large (3 inches across), of 40-50 petals, clear rose pink, much as some of the HP. sorts. The stems are smooth and deep red in winter. It is the most beautiful in form of the garden sorts from our native species. It is really the wild plant of *R. blanda* with HP. flowers. Pax Apollo (Dr. N. E. Hansen, 1938) is similar, but the flowers are not as large or full. It has about 15 petals. The form is of a semidouble pink sort of *R. multiflora* in bush habit. The seed parent was a form of *R. sempervirens*, with pollen of *R. blanda*. Pax Amanda is similar, being a union of a *R. multiflora* climber X pollen of *R. blanda*. Pax Iola (Dr. Hansen, 1938) is a climber, thornless, much like Tausendschön in effect, the winter twigs bright red. The flowers have 15 or so petals, soft pink, fading white, clustered. Now Yawa will be released (Dr. Hansen, 1940), also of *R. multiflora* parentage and growth, more double than Pax Iola. Not only do these five *R. blanda* hybrids have thornless stems, bright red in winter, but they are wholly hardy to temperatures far below zero.

Sunshine Rose (*R. suffulta*, known also as *R. heliophila* and *R. pratincola*) is native from Alberta to Texas. It is a sister of *R. blanda*, but the stems are very prickly, dull brown in winter. The leaves are downy below, and even grey tinged above, so the foliage color is unlike the smooth light green of *R. blanda*. But the flowers are the same, perhaps not quite as large. Two double forms are known, both natural varieties. The first was found by Mrs. Mina Lindell, before 1924, in Butte County, South Dakota. It was given her name and sold by Dr. Hansen in 1927. It is very much like Betty Bland in effect,

or the "Pax" roses, a clear pink of about 15 petals, but the plant is thorny. Percy Wright, of Wilkie, Saskatchewan, offered "Woodrow," a double form, in 1939, presumably found wild in that province. It is a clear pink, quite double, not as large a flower as Mrs. Mina Lindell, but with more petals.

California Rose (*R. californica*) is a sister species from our west coast. The prickles are stout and wide, and the pink flowers are in broad flattened clusters. A form with semi-double flowers was in the Arnold Arboretum, and apparently at Kew Gardens. A hybrid, Theano (Geschwind, in Hungary, 1895), has been offered by Bobbink & Atkins since 1936. The flowers are of medium size, opening flat, of 15-20 petals, light carmine-rose, in broad flat erect clusters. The effect is like flat clusters of polyantha roses on a big wild shrub.

A similar plant, but the flowers not clustered, is Nootka Rose (*R. nutkana*), from Alaska to Utah, quite like our *R. virginiana*. Father Schoener crossed this with Paul Neyron, HP., and produced a plant with large single flowers, clustered, deep rose. This was put in the trade in 1930 as Schoener's Nutkana. It does not have a double flower, but J. H. Nicolas, by using this as a parent with HT. roses, created several double HT. sorts—Leonard Barron, Polar Bear, Mrs. Francis King and Shenandoah. But the HT. characters have hidden the original wild Nootka plant. They are really HT. in all ways. Another hybrid is Cantab (C. C. Hurst, 1927) produced in England by pollen of Red-Letter Day, HT., on *R. nutkana*. The flower is single, deep pink.

Prickly rose (*R. acicularis*) is native to all northern America, the twigs with

many stiff bristles. The flowers are solitary, dull rose in color—one of the earliest of species to bloom. F. L. Skinner (of Dropmore, Manitoba), maker of Betty Bland, has crossed this Prickly rose with the Rugosa rose and again by other garden roses. These were released in 1939, but seem not to be in the trade. Apparently they are Hybrid Rugosa in habit, with large clustered flowers in shades of pink, with repeating bloom. The names are George Will, Dorothy Fowler and Wasagamung. A different plant, with semi-double red flowers on a plant like the wild Prickly rose, but clustered, is Pike's Peak, from pollen of Hollywood, HT., on the wild plant. This was produced by N. C. Gunter, and put in the trade by Bobbink & Atkins in 1940. It is a very pleasing "half-wild" rose, very vigorous and hardy.

Lastly, our only native climber, the prairie rose (*R. setigera*), has become the parent of many climbing roses, and of late has several bush HT. sorts, particularly the work of M. H. Horvath. But both climbers and bush kinds have flowers and foliage of HT., for the three leaflets and corymb of flowers of Prairie rose have become lost in the new forms. The Prairie parent appears only in vigor of growth and hardiness of plant. Recently, a seedling of Mrs. F. F. Prentiss (one of the best of the setigera climbers) is an exact duplicate of the wild prairie rose, in foliage, in habit of growth and date of bloom (late July), but the flowers are quite double, of many short petals, a double wild rose of very late bloom on a climbing plant. The doubling must have come from the male parent, the HT. rose, Lady Alice Stanley. This might be the beginning of hardy ramblers of very late bloom.

STEPHEN F. HAMBLIN.

A New Device for Layering

Layering of branches was done first by Nature in her own way. Man observed that where a branch contacted the soil or became accidentally covered with earth or leaves, the roots often broke forth, and a new plant resulted. He then proceeded to bend branches to the ground and cover them with soil, sometimes girdling or cutting into the branch at the buried point to stimulate root production. Often it was impracticable to bend a branch to the ground, and the practice of air-layering or marcottage resulted, in which soil or moss was held about the branch in mid-air. Many devices may be and have been used for holding the soil or moss in place such as a wrapping of gunny-sacking, or split earthen pots, or boxes of bamboo. A device not known to have been used previously, was recently tried at the U. S. Plant Introduction Garden at Coconut Grove, Florida, where the use of sections of old inner tubes originated with E. W. Shaw.

The branch to be marcotted, first has a ring of bark removed, or instead of girdling, a diagonal upward cut is made into the branch and the cut held open by a very small pebble or other obstacle. Then a one-foot section of inner tube is placed over and about the cut portion and is tied below. The improvised "pot" is next filled with dampened sphagnum moss. The open top catches rainfall and permits easy watering. No evaporation occurs through the rubber side walls, and the drainage can be regulated by the tightness of the tie at the bottom.

For large marcottes, sections of automobile inner tubes have proved well adapted, particularly in the smaller sizes. For layering very small branches, bicycle tubes have been used. These small, thin-walled tubes, however, last

a shorter time and require much more frequent attention in watering.

The use of sections of inner tubes in layering is shown in the photographs.

T. B. McCLELLAND.

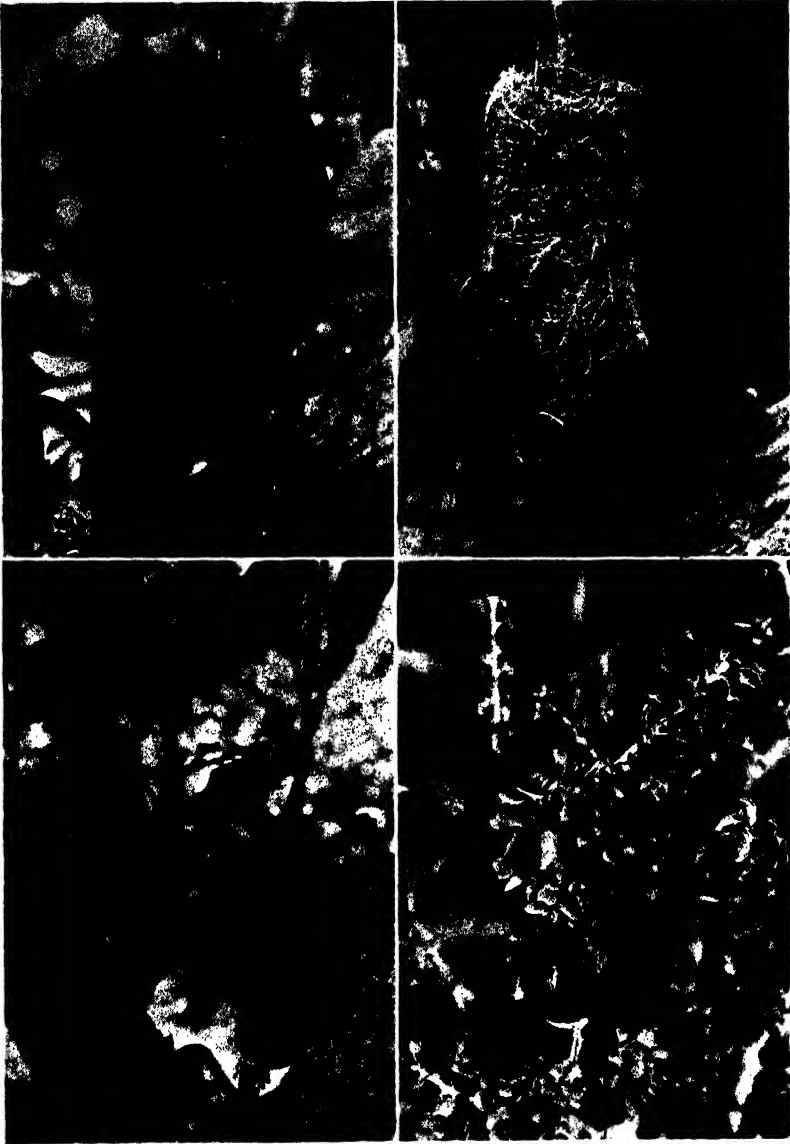
Coconut Grove, Fla.

Daffodils at Swarthmore

A collection of 600 varieties of daffodils offers an exceptional opportunity to study them and make comparisons between many of the newer and older ones. Such a collection, comprising more than 20,000 bulbs, has been established by the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College, Swarthmore, Pa., under the directorship of Mr. John C. Wister. There are three separate plantings. The first of 100 varieties and 10,000 bulbs, mainly of the older ones, is planted at the edge of the lawn among trees and perennials. The second, of 280 varieties and about 11,000 bulbs, is planted in raised Dutch beds and comprises most of the popular varieties handled by American seedsmen and dealers. Finally, there are about 300 novelties and over 1,000 bulbs in a coldframe, each variety plainly labeled with the name, class, and source of the bulbs.

When visited by the writer on May 7, 1940, the height of the flowering season had passed, but it presented a favorable period to observe and compare the late-midseason and late varieties.

The trumpet class was largely out of bloom but a few of the later varieties were in good condition. Lord of the Manor is a large yellow, of medium height, and excellent form. Bravo is tall, large, and of good form. Kimberley is outstanding because of its huge size and a big flaring rough trumpet; light lemon yellow. Sultan has a very



Bureau of Plant Industry

Marcotting Ficus pandurata

Fig. 1.—Close view of marcott

Fig. 2.—Back View

Fig. 3.—Use of inner tube

Fig. 4.—Marcotting technique on Megistostegium retusum

long tubular trumpet with a neat flaring brim. Although Tor was rated medium in size, it is one of the outstanding varieties among the yellows because of its polished ivory smoothness, rich color, and fine form. Hebron rated equally high in form and quality. Because of its smoothness, good form, and very large size, Youth would be rated much better if the stems were stretched a few inches.

Although classed as jonquil hybrids, Mr. Wister placed General Pershing and Numa Pompilius with the yellow trumpets. They meet the description of yellow trumpets, have one flower on a stem, are very tall, and of the deep rich yellow color of many of the jonquil hybrids.

Chastity rates high among the white trumpets; although it opens cream, it passes to white. It is large, tall, and a good one.

Dreadnaught, His Excellency, and Locarno were the most notable of the bicolor trumpets. They are valuable because of their late-blossoming period. Dreadnaught is a big yellow. His Excellency has a light-yellow trumpet; is large, tall, of good form, and long lasting. Locarno is very vigorous, but not as smooth as Silvanite, another light-colored one.

The Incomparabilis were mostly past their prime. Brotonne was outstanding among the yellows. It is a very large flower of fine form, has a canary-yellow perianth and a spreading saturnine-red crown. Agra is one of the best and showiest. It is very large and regular with very broad overlapping creamy white perianth of great substance, and a large spreading crown of bright orange. Very vigorous and a free bloomer it is also a high-class exhibition flower. Palma has a large flat orange crown and broad white round petals.

St. Egwin always commands attention because of its height, large size, perfect form, and uniform clear soft yellow color. Bagdad is possibly a more striking Barrii because of the sharply defined broad scarlet band around the rim of the cup, and it is nearly if not quite as tall, large, and vigorous. Cordova, one of the newer varieties, makes, with the above, a fine trio in the group of yellow Barriis that contains too few really high-class varieties. It is also very large, smooth, and quite circular and has a shallow cup stained dark rich red.

There are so many good bicolor Barriis, mostly rather late bloomers, that it is difficult to select a few. Danger is of medium size, opens with a yellowish tint that soon passes to white, and has a dark yellow cup with a broad blood-red rim. Fleur is of good form and size and has a large, flattish, yellow cup. Mayflower is very tall, a Poeticus-Barrii hybrid, having broad glistening white petals and a yellow eye with red picotee. Peggy has very broad round petals and a small rich yellow cup. If Pride of Virginia had more substance, it would be a great flower but the petals are too floppy. It has the height, size, and color that make it a very attractive garden plant. Stamboul has an unusually interesting and attractive cup with overlapping frills, orange edged bright red. It is large and of excellent form. Therapia was, as always, outstanding. Although introduced in 1927, it has probably not been surpassed as a show flower.

Mr. Wister has a special fondness for white flowers and has brought together a very notable group of the large-crowned Leedsis. Andes and Water Lily are very large (5 inches) informal flowers of Tenedos type. One of the three would be sufficient for most collections. Daisy Schaffer was

outstanding because of its great size, shapely form, and gorgeous lemon frill that develops on the crown as the flower ages. It is long-lasting, tall, and vigorous. Carnlough and Dunlewey, two of Guy Wilson's originations, were notable for this high quality and smoothness. Carnlough has a soft-pink frilled crown that quickly fades to white; Dunlewey is a free, vigorous grower, but the stem is rather short. Pinkeen, another Wilson origination, is a medium-sized flower of fine form and quality that may have a pink crown in Ireland but the color does not develop under the warm sunny skies of eastern America. Gracious is a large long-standing flower, of good size, form, and substance. Silver Star, although a medium-sized flower is one of the best of the group—well proportioned, early, and long standing. Pucelle resembles St. Egwin in shape but is not so tall. It is a vigorous plant that produces a flower of distinct character and quality. Sublime is a pink-crowned flower of better form than Mrs. R. O. Backhouse but the color does not hold so well. It has pointed petals and is a decided addition to the "pink" group.

Nelly, because of its size, broad petals, and high quality, dominated the group of small-crowned Leedsii's.

No collection of daffodils would be complete without some of the smaller flowers. Acolyte and Shot Silk, Triandrus hybrids having broad petals and being vigorous and prolific seemed to outshine the other varieties. Aurelia, although bearing generally one flower to a stem, rather eclipsed the other jonquil hybrids in beauty of form and richness of color.

Kingcraft is a decided addition to the rather large group of cluster-flowered Poetaz although it produces only two flowers on a stem. It has broad round petals, a large flat yellow eye, and is

very tall and vigorous. Geranium produces four flowers on a stem and has a large orange cup, whereas Irmelin is taller than most of the Poetaz and has an orange-red cup.

No Poet seemed to outshine its brothers and sisters, there being more similarity among the flowers of this group than among the others. Thelma appeared as good as any. It is tall, vigorous, and prolific.

Romagna is a striking double, a large flower having yellow and orange petals. Inglescombe, Holland's Glory, and Primrose Phoenix were much alike in size and form but presented a nice range in shade of the self-yellows.

EDWIN C. POWELL.

Three Interesting Foreigners

Flower histories are often sad. So many beauties have had their day and gone, leaving little to tell of their charms. A picture in the Botanical Magazine, perhaps or in one of Jacquuin's or Redouté's big tomes or a brief reference in the Kew Index. We know no more of the reasons they left the early gardens and greenhouses than we know why the Maya civilization failed or why the Khmers lost Angkor Wat. One or more of the same reasons in each case, probably, climate, enemies or disease. The people of Chitchen-Itzá and Angkor have gone but the flowers may live still, perhaps, in some old English gardens. We like to think so.

The Brilliant Nerines

Many survive and overcome numerous vicissitudes of neglect and the crowding out by later arrivals or disappear for a time only to stage a strong return. Among this group we find the nerines which seem about to make a

spectacular bid for popularity in the United States. Anyone who has seen the lovely nerines in recent horticultural exhibitions will be glad to have them become abundant here, old timers that they are. They are flowers of beautiful and interesting forms and of exquisite colors, ranging from deep crimson-scarlet through cherry and salmon tones to white. They have moreover an unusual quality. The perianth segments glisten as if the entire surface were set with tiny mirrors giving a sparkling brilliant look to the flowers. By artificial light they seem to be frosted with fine gold dust. E. H. Wilson speaks of seeing acres of them in bloom in South Africa!

They have their own history. In the 16th or 17th century a ship came from Japan, stopping as they practically always did at the Cape of Good Hope for water and supplies. Among the cargo brought north was a shipment of nerines intended no doubt for English gardens. The ship was wrecked on the coast of the Channel Island, Guernsey. Washed ashore with other wreckage, the nerine bulbs lay unnoticed for a time, the sand covering them till a year or two later, the islanders were suddenly thrilled by the sight of the gorgeous flowers. The possibilities in their culture were seen and ever since then the so-called Guernsey Lily has been grown in large quantities and shipped to England. The Guernsey climate suits them perfectly. But alas, this lovely tale is fable, for no nerine grows in Japan.

So far the nerines, though there have been a few fine collections of them, have been rather rare in America but they are not hard to grow. Only a small number of the South African plants are hardy in the northern states but many of them will do well in the south, flourish in California and will in the north

make splendid subjects for greenhouse and sunroom and as annuals or summer bulbs. They deserve to be better known. The principal things to remember are that they need all the sunshine we can give them and that bulbs must be thoroughly ripened. Coming as most of them do from parts of South Africa where the rains fall abundantly at one season and then are followed by months of dry weather, the bulbs face conditions after blooming almost like those of our western deserts. Ripen them well and they will bloom for you.

Nerines belong to the family Amaryllidaceae and are of two types, that in which the stamens protrude stiffly and the one where they are declinate or drooping. In some the perianth segments are broad and flat, in others narrow and crisped or fluted. The two types are quite distinct but the difficulty comes when one tries to give a definite name to a particular flower, for they have been so crossed and recrossed that even the men who grow them and exhibit them cannot tell you just what they are. The stiff-stamened one shown belongs to the type which includes *N. sarniensis* (the Guernsey Lily) and *N. curvifolia* with its varieties *fothergilli* and *fothergilli major*.

Can You Name This Flower?

This one with the long drooping stamens and the much recurved petals, though it was bought for a nerine and has many traits of the second type of the genus, which includes *undulata*, *humilis*, *flexbosa*, etc., but more probably a *lycoris* for it resembles very closely *L. radiata*. The two genera, *Nerine* and *Lycoris*, are nearly related and the names have been used back and forth. *Lycoris radiata* has indulged in a diversity of names, having been called at times, *Nerine japonica*, Rayed Lily Daffodil and Snowdrop Leaved



Sarah V. Coombs

Fig. 1.—*Nerines*Fig. 2.—*Schizostylis coccinea* (Pink Kaffir Lily)

Amaryllis beside its probable true name of *Lycoris radiata*. It is a native of China and Japan. There is much confusion in the names of many of these old flowers and there are lifetimes of botanical work to be given to straightening them out.

Bulbs of these groups are not a bit fussy. Indeed the South African flowers, among which we may for the moment include this other, if their very definite and simple needs are considered, are an amiable lot and should be grown far more than they are. It is so exciting for a flower show judge to come suddenly on a brand-new flower! These judges are a hard-working group and deserve some reward.

If you plant any of these bulbs, make the soil of good medium loam with sand enough to make it porous and add bone meal. Some gardener says: "A little

lime rubbish with it does very well." Most of them are fall-blooming—October or November—with leaves following the flowers. In warm climates they are to be put in a sunny spot where they may be dry and warm in summer for their ripening. In the north put three bulbs in a 5-inch pot and do not repot till bursting of the pot is threatened as they hate to be disturbed. Rub off the bulblets if necessary. Fresh earth may be added when growth is starting by replacing the top inch or two. The flower stalk grows quickly, followed by the leaves. When growth starts, in September or October probably, water carefully at first, then increase and give plenty of water till the leaves begin to turn yellow, perhaps in May. Give weak manure water occasionally and keep up the cultivation through the whole growing period, then withhold

water gradually. After the foliage has died down, the best place for the pot is on its side on a greenhouse shelf in full sun all summer. A cold frame with the glass on gives the proper treatment also or a sunny window in the cellar, where the plants may be left and forgotten till September. The warmer they are kept, the surer they are to bloom. The only pest that seems to trouble them is mealy bug but they have a clean fine growth that often is quite free from any trouble. They like a cool greenhouse but do not need one and will grow and bloom in a sunny window. I say this advisedly.

The flowers grow, 4 to 30 in an umbel at the end of a tall scape and the leaves are strap-shaped, dark rich green. The flowers may be set among ferns or foliage plants which will fill in the bareness due to their own delayed leaves. They are strikingly beautiful and interesting with their glistening petals and long colored stamens. Through no fault of the dealers but simply because the group as a whole needs some straightening out, you may not always receive the exact kind you order, but they are all lovely so there will be little to regret in any case.

The Kaffir Lily

Schizostylis coccinea. Kaffir or Fire Lily. Here we are on surer ground. This South African flower has been known to English gardeners for a long time but since the genus is a small one, with only two or perhaps three species, there is no great abundance of hybrids, which are interesting to the gardener but confusing to the botanist. The Kaffir Lily is found growing wild in many different parts of South Africa, eastern and central, Transvaal, Griqualand, Swaziland, etc., but practically always very near water, which gives an

idea for its cultivation. It belongs to the great Iris group, the Iridaceae. There are no true irises in South Africa but the *Schizostylis* is their first cousin. Its color is a gorgeous crimson and when it blooms, the veld looks as if it were on fire. The rainfall which starts it into bloom ends in May—the seasons are opposite to ours and the time corresponds to our autumn—after which rainy season the ground becomes as hard and baked as a brick and the plant becomes dormant till the rains come again.

The picture shown here is of the variety Mrs. Hegarty, the Pink Kaffir Lily. Though very generally considered a variety of the species *coccinea*, it may perhaps be a separate species since a flower, gathered at an altitude of 3,000 feet, was described by its finder as a "beautiful pink *Hesperantha*," the genus *Hesperantha* being a closely related, almost identical one. In any case the two Kaffir Lilies are much alike in everything but color and blooming time, the Mrs. Hegarty variety being a pure clear pink and blooming a month or two earlier than the scarlet one. The pretty flowers grow on long slender stalks and are fine for cutting, lasting a long time in water. The scarlet kaffir Lily does not bloom till October or November so is useful in the north only as a potted or cold frame subject. In the south and on the west coast, it would be a garden plant. The pink one, blooming so much earlier, from August to October, can be grown outdoors in summer if planted early enough. Either crimson or pink, the Kaffir Lily is well worth a trial.

SARAH V. COOMBS
Scarsdale, N. Y.

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Claude Hope

Passiflora lutea

[See page 44]

Early Plant Explorers

VIOLET NILES WALKER

THERE are many more avenues of approach to the subject of plant collecting than are apparent at a first casual glance. We sit at home and enjoy—(or struggle with, as it may be), the fruits of the labors of adventurous pioneers whose enthusiastic efforts and selfless devotion to horticultural exploration have given us the modern garden. But few of us have any conception of the effort or the romance, the dangers and the thrills that even one individual flower may represent.

That we do not give just due to the scores of men who have risked their lives, and so often lost them under the impetus of their enthusiasm, is not however, entirely our fault, for until very recent times, when the development of printing facilities made it possible for any literary minded traveller to burst into print, few books commemorated the achievements of those early collectors, and even such as have been published are today out of print and hard to locate. Short articles or paragraphs may be dug out of records and from time to time enlarged upon, but for most part their achievements lie buried in scientific journals in the form of articles, notes, reports, or erudite discussions on minute details of classification and nomenclature.

A survey of material available in horticultural libraries today not only emphasizes this fact, but another as well, which is that the majority of early plant explorers seemed less concerned with publicising their own personal experiences than in the material which they introduced, while those of the 20th Century have not let their light be dimmed under the proverbial bushel, but have given, and are giving, vivid and thrilling testimony to the life and experiences of the plant collector.

However, the extensive and detailed narratives of such men as Fortune, Forrest, Wilson, Farrer, Kingdon, Ward, and so forth, are not alone valuable for their individual interest, but for the glimpses we get, through their eyes of their predecessors, and the better understanding of what was accomplished over three centuries, not only under the handicaps of primitive traveling conditions on both land and sea, but under the perils which, from the earliest times even to our own day, have always threatened the travellers who ventured beyond the borders of the white man's territories into unexplored regions.

No matter when or where the adventuring plantmen were spurred on to intense horticultural exploring activity, no matter how the scene might shift from one savage locality to another, these men who were part of the advance guard of civilization exposed themselves voluntarily and eagerly to situations of such extreme peril as it is difficult to picture today, when enjoying in quiet gardens the fruits of their labors.

But how much more we would appreciate the beauty of our most familiar flowers if the stories that lie behind their arrival with us could be unfolded—and where might we not travel!

A lily would link us with the head hunters of Formosa; a primula with the savage tribes of western China and Tibet, where Robert Fortune could only penetrate disguised as a Chinaman. Few know that from the black Bushman of Australia the acacia and eucalyptus families were bought at the price of many human lives, one of the most notable being that of Richard Cunningham. A gladiolus ties us closely to the great engineering feat that opened up tropical Africa when Francis Fox, in

1881, found the little *primulinus gladiolus* growing above the bridge he built across the Zambesi River, and sent the first specimens home to his English garden.

In the naming of that beautiful greenhouse plant *streptocarpus Rex*, James Bowie, an early south African explorer, makes almost the only contribution towards preserving the memory of a romantic character prominent in the early history of the Cape of Good Hope, and certainly deserving of recognition for his contribution to horticulture, even if forgotten by history. This was George Rex, a natural son of George III and Hannah Lightfoot, a Quakeress. Rex was a strong and able character but a loose liver—his many known descendants vary in color from white to dark brown—and his Royal Father fearing what his future course might hold for England, exiled him for life to South Africa, though supplying him plentifully with cash.

There he engaged in many occupations, among others, adventurous plant collecting with Bowie, yet there are few records of his discoveries, and only the naming of the *streptocarpus* suggests to us the contributions he made to England.

Moreover, there are many plants now in generally universal usage whose introduction has been completely lost in oblivion, for instance, the peach is indigenous only to China yet it found its way, how we do not know, though probably by land, to Persia and from there into Eastern Europe before the Christian era.

A bird's-eye view is all that we can take at the moment, with only the highest spots to be touched, and it has taken a firm hand to hold down the topics, for once launched into the subject, each individual studied is more absorbing than the last, and it soon becomes a

question of not being able to see the forest for the trees.

In this bird's-eye view there should always be in the back of our minds, the consciousness of the back-ground of excitement, of hardships and danger and heart-breaking failures, which had to be undergone even with the many thrills, before the introductions of the great pioneers became naturalized citizens of our gardens.

Moreover, a brief resume of historical conditions must be the first necessity for dealing intelligently with the subject, since nothing had more influence on our present day gardening than the fluctuations of medieval sea power.

It is hard for us to realize that almost up to our own times, when the Suez Canal was opened, the nearest route from western Europe to Eastern Asia was around the Cape of Good Hope, a hazardous voyage of many months, in ships that seem to us today little more than pleasure craft. And yet, from 1600, when the first East India company was formed in England by Queen Elizabeth, there was a steady stream of trade from Western Europe to Eastern Asia. The English company was soon followed by similar rival companies in Holland, Portugal, France and Denmark, and the wealth of the Indies and China—silks, jewels, calicoes, spices, drugs, silver, tea, etc., etc., formed the important cargoes which crowded the holds on the long voyages of many months returning from the Orient, and it would seem that there could have been no room left on board for the cumbersome paraphernalia needed to bring home living plants.

Plants, not seeds, were the first to be collected, and before the Wardian Case was invented in 1836, small portable greenhouses were evolved which called for constant and careful nursing, and were the only means of transporta-

tion. How much plant material was collected, and how little in proportion survived we can only guess. Witness, for instance, one experience of Charles Maries, as recently as 1877, when the results of an extensive collecting trip through northern Japan were shipped to a trading port in a vessel loaded with sea-weed. The first day out the wet, swollen sea-weed burst open the little vessel, which was run ashore by the captain. The box of bulbs, seeds, and cones was rescued and put into another boat, but this time it in turn capsized and sank, losing the entire lot.

The chief fields of exploration during the 17th, 18th, and early 19th centuries were China, the East Indies, South Africa and Eastern America, while Australia, South America, and our own West Coast and Tropical Africa were not generally opened up until the middle and end of the 19th century. The greatest tide of plant exploration has been since 1900, and in this first third of the century it has grown to such huge proportions that today, it is a trade, not an adventure—and yet a trade that will always have its thrill and invitation to some.

The first European traveller to the Orient from whom we have any detailed account was the Venetian, Marco Polo, who, with his father and uncle journeyed to Cathay, (or China as we know it) and lived there from 1271 to 1289. He later wrote an account of fruits, vegetables, and flowers he found there in common use, and his memoirs, dictated in prison, are the first authentic account of the great Chinese civilization. So great were the marvels he described that it was regarded as one of the fairy tales of the ages, and its truth and reliability were not established till the opening of the 19th Century, when the wave of modern explora-

tion established his veracity and paid tribute to his achievement.

Shortly after this period China became closed to outside intercourse, and was not opened to Europeans until 1516 when a Portuguese captain, Raphaello Pestrello, managed to reach Canton, having in some way contrived to sail from Malacca in a Chinese junk. Following this, the Portuguese had a monopoly of the Chinese trade for over a century, medicines, drugs, etc., being their chief commodities. There is no record of flowers or ornamental shrubs and trees being brought to Europe by them, except that to a Portuguese Viceroy of India, Juano de Castro, tradition gives the credit for bringing the sweet orange tree to Portugal. As a mere mention of historical continuity, the Spaniards next appeared in the Orient, conquering the Philippines in 1543, and trading with the Chinese, but so far as can be found, making no contributions to European gardens.

But with the arrival on the scene of the Dutch, in the later 16th century, a new era began. Spain and Portugal suffered an eclipse and for over two centuries the Dutch East India company (founded in 1631) practically had the monopoly of the trade with China and the Indies, and were the only European nation privileged to trade with the tightly closed country of Japan. From this time on plants began to creep into Europe in increasing quantities. We know that the Dutch brought in many bulbs, among them lilies from Japan, of unknown hybridization, from which are descended the unbellatum hybrids of today, but the names of their introducers are unknown.

We think of China as the first foreign parent of our modern gardens, little realizing that introductions from South Africa came at the same time. For the Cape of Good Hope, being the

half way point to the East Indies trade, drew many explorers, following the establishment of the first Dutch settlement in 1689. The names of these early Dutch Cape pioneers rest in the same oblivion as those of Japan, but we know that they were a busy lot, for in 1678 Jacob Breyne speaks of a number of Cape flowers as already well established in Holland gardens—among them *Oxalis purpurea*, mesembryanthemum, and, interesting to note, *Ornithogalum thyrsoides*, this last, so recently as within the last ten years heralded in American catalogues as a new introduction—while in the next hundred years great quantities of the wealth of the Cape were absorbed into Holland and England.

But England gives clearer records, and after Masson, the greatest of them all, the names of George Stonestreet (who collected about 1695), Sir James Cockburn, 1773, Joseph Niven in 1798, and John William Burchell in 1811, cover two centuries of plant introduction from South Africa. To them are due many of the plants and bulbs that are today either so completely naturalized out of doors, or so indispensable as greenhouse plants, that their origin is ignored by the modern world, and they have become as natural as bread and butter, with no questionings as to their ancestry.

In 1817 James Bowie was sent out from Kew, and remained the rest of his life, sending vast collections of Cape flora back to England.

Francis Masson and Carl Peter Thunberg are the outstanding South African explorers and collectors and the wealth that they have sent home has permanently enriched two continents. Masson was a Scotsman, sent out by Kew Gardens in 1772. For two years he explored the Kaffir country, much of it in company with Thunberg,

sending home plants such as *Ixias*, *Aloes*, *Euphorbias*, *Stapelias*, etc., and many new varieties of heaths. Returning to England he was sent by Sir Joseph Banks, head of the R. H. S., on a collecting voyage to the West Indies, which met with many mishaps from storms, fights, etc. In 1786 he was again in South Africa for nine years. He died in Montreal in 1805.

From the Journal of South African Botany we have detailed notes on the South African achievements of Carl Peter Thunberg, doctor, surgeon, botanist, Chevalier of the Swedish Order of Vasa, Professor of Botany at Upsala, succeeding Linnaeus, whose pupil he had been, and world traveller during the latter half of the 18th century. His name is linked not only with South Africa, but with the East Indies, and with Japan at a time when Japanese flora was entirely unknown. He wrote the first "Flora Japonica." As before noted, it must be remembered that up to 1853, when our Admiral Perry so boldly opened the ports of Japan to the world, Japan was a closed nation to all but the Dutch. Their monopoly of this Japanese trade is another one of those interesting by-paths which we must steadfastly ignore, and only mention it in as far as it concerns our Chevalier Thunberg.

Through the interest of two great botanists, the Burmans, father and son, at Amsterdam, it was arranged that Thunberg should accompany an expedition of the Dutch East India Company to Japan, but since no foreigner besides a Dutchman could enter that country, the distinguished Swede must become in appearance and language a Hollander. So following his three years at the Cape, where he learned Dutch, he was appointed first surgeon on a Dutch merchantman, and sailed from Batavia to Japan. Here he stayed for sixteen

months, and only the most cursory glance at his importations show the great value of his work. *Berberis Thunbergii* alone might be his monument. Java and Ceylon were also explored and tapped. Thunberg died in Munich in 1866.

Thunberg was followed in the Dutch East India Company by one of the greatest of all plant collectors, Philipp Franz von Siebold. Born 1796, a Bavarian, von Siebold was a doctor and an accomplished scholar, as well as an explorer. Gaining entrance to Japan, as had Thunberg, through services as a Dutchman on a Dutch ship, he lived there from 1823 to 1839, studying, collecting plants and preparing for his great work on "Flora Japonica." Much of his success among the Japanese was due to his reputation as a doctor, and we are told that he enjoyed greater co-operation and freedom than any of his predecessors.

It is said that he sent over four hundred plants back to Europe. To him we owe many flowering trees and shrubs—crabapples, flowering cherries, lilies, weigelas, witch hazels, hydrangeas, etc., as well as conifers and deciduous trees, in fact, the largest collection introduced at that time. The permanency of his introductions was aided by his establishment, in 1850, of a nursery and Jardin D'Acclimation at Leiden, where he cultivated and distributed the introductions made possible by the friendship of the Japanese. A second trip to Japan, in 1856, after the ports were opened, was attended by additional cooperation from the Japanese, whose former friendship had been strengthened during the intervening years.

The English East India Company was the chief vehicle for plant exploration in China from early seventeen hundred, and it is interesting to note that

the first collectors were almost always ships' surgeons. Samuel Brown is the first we have mention of, James Cunningham, Kerr, and Barclay following.

Cunningham explored the Chusan Islands from 1701 to 1703, and sent back to England *Gardenia florida*, the vegetable lamb (*Cibotium barometz*), *Chimonanthus fragrans*, long used in England, and only reaching us in later years, *Sophora japonica*, *Cryptomeria japonica*, *Cunninghamia lanceolata*, and many others.

But of the early collectors in China, sent from England, the name of John Reeves stands out preeminently. He was the son of a clergyman near London. Born in 1774, he was educated at Christ's Hospital, and early began work in the tea service. In 1812 he was sent to China as an assistant in the East India Company, rising subsequently to the post of Chief Inspector of Tea at Canton. We are told he was a man of unusual attainments scholarly, scientific, and preeminent in business. He studied the Chinese flora, and in his collections was discriminating in his choice of material to be sent back. He let no ship return to England without the small portable greenhouses filled with potted plants he had nursed and established. He is responsible for the first Chinese azaleas, chrysanthemums, Moutan peonies, Chinese primroses, *Histeria sinensis*, and so on and on. He has been called one of the Nestors of Horticulture. He died in 1856.

With the opening of Japan, our most notable Englishman is possibly John Gould Veitch, and his name opens up one of the grandest chapters in horticultural history. Five generations of Veitchs carried on a business that has been world-wide in its scope and influence, and the firm of Veitch and Sons, now unfortunately out of existence, was probably one of the most in-

fluent factors in modern garden development. They were remarkable as growers and developers of types; they united with scientific organizations in raising standards both of material and exhibiting; and they maintained, over the greater part of the nineteenth century, a corps of able and distinguished plant collectors in every continent. A list of the best known of these shows names that are familiar through their connection with plants now in daily use. The name of William Lobb, who collected in South America and California from 1840 to 1857, should at least be known to us through the nasturtium named for him — *Tropaeolum Lobbiana* var. *Veitchii*. But it was he who sent the first seeds and cones of the California Sequoia to England, together with *Berberis Darwinii*, *Escallonia macrantha*, *Araucaria imbricata*, and many of the choicest varieties found from the California Sierras down through the great ranges terminating in the Chilean Andes.

Another Lobb, Thomas, spent years in Java and India, and his name is synonymous with some of the finest orchids introduced to cultivation and also some of the first *Nepenthes* grown in British gardens. In Wilson's *Plant Hunting*, the chapter on the *Nepenthes*, "Plants that Kill and Eat" is one of the most interesting in the book.

Richard Pearce, who was one of the pioneer begonia specialists, was sent out to South America by Veitch and Son in 1859, for the purpose of specially collecting seeds of *Librocedrus tetragona* (the incense cedar), the Chilean Pine, *Araucaria imbricata*, and many hardy shrubs, as well as greenhouse plants and orchids. In two expeditions he sent home quantities of all these, and in addition, collections of tuberous begonias that have formed the nucleus for modern begonia hybridization. *Nie-*

rembergia rivularis is one of the familiar flowers we owe to him. Pearce died in 1867 at Panama, of the deadly tropical fever.

The name of one of Veitch and Sons' less successful collectors, Carl Kramer, has nevertheless been preserved to us by the naming of *Lilium Krameri*. J. Henry Chesterton, a noted collector of orchids, who brought the first scarlet odontoglossum to England for cultivation, lost his life through his own recklessness in South America.

Another of the firm's collectors, Gustave Wallis, whose remarkable trip across the continent of South America from the mouth to the source of the Amazon, is still a matter for emulation, died of dysentery at Cuenca, 1878. Among his introductions is our saucy little pink-tongued modern favorite, the anthurium.

F. W. Burbidge, naturalist, traveller, author, horticulturist, and Curator of the Botanic Gardens at Trinity College, Dublin, collected for Veitch and Sons in Borneo in 1877-1878. His chief objectives were rare varieties of tropical pitcher plants, and he successfully introduced the Great Giant Pitcher Plant of Kina Balu, *Nepenthes Rajah*; orchids and ferns were also well represented in his collections.

The four greatest of all the Veitch explorers were David Burke, Charles Maries, John Gould Veitch, and Ernest H. Wilson. Burke travelled from 1881 to 1896, and is said to have covered more miles in search of plants than any man sent out by Veitch. He sent back to England some of the rarest and most beautiful tropical plants, especially orchids, from the wilds of Borneo, British Guiana, New Guinea, the Philippines, Burma, the Celebes Islands, and the Moluccas in the South Seas. Little is known of him or his death. He preferred the society of natives, and died

among them far from any European settlement, in Amboina, one of the Moluccas. His death was learned only by chance through a wandering German.

Charles Maries had an interesting and romantic life. His travels covered wide territories in China, but Japan was probably his greatest field, and we owe a huge debt to him for many of his introductions. Among them are several of our finest fir trees, *Abies Veitchii* and *Abies sachalinensis*, *Styrax obassia*, hydrangeas, several lily forms, many varieties of Japanese iris, and probably most familiar to us, *Platycodon grandiflorum Mariesii*. Maries left the service of Veitch and Sons in 1882 to take the post of Superintendent of the Gardens of the Maharajah of Durbhungah, in India, where he laid out the palace gardens. Later he undertook the same work for the Maharajah Scindia of Gwalior, and was in charge of the palace and state gardens until his death.

John Gould Veitch was the outstanding explorer in the Veitch family connection. He travelled for ten years, 1860-1870 through Japan, Australia, the South Sea Islands, and the Philippines and introduced to England one of the largest collections of evergreens brought home by any one individual, in addition to many varieties of tropical plants. Through his position, early in his travels, as a member of the staff of the British envoy to Japan, Sir Rutherford Alcock, he enjoyed many privileges one of which was the opportunity of being the first European to climb to the summit of Mt. Fuji. He died of a haemorrhage of the lungs in 1870 brought on through exposure. He was only thirty-one years old.

Ernest L. Wilson, who in 1899 started his explorations under the house of Veitch, was the last of this great

band and his name brings the list of plant explorers nearly to the present time. Indeed Wilson properly belongs to that brilliant circle of modern names guaranteed against oblivion wherever Horticulture and Literature flourish jointly—Reginald Farrar, George Forrest, Frank Meyer, Augustine Henry, Aaron Arohnson, and still living, F. C. Rock, Kingdon Ward and David Fairchild. All of these are more or less familiar to us and their achievements fully recorded in their works.

The procession of Englishmen who, from 1600 explored North America, pushing ahead always of our ever-moving boundaries, forms a chapter to itself. Such names as the Tradescants, the Bartrams, Douglas, etc., etc., are among the best known but there are a host of others well worthy of study and further acquaintance.

The last half of the 19th Century with its rapid development in world travel facilities produced a band of men no less famous and no less dauntless in their conquests of untraversed territories. There is a long list but only four of the outstanding can be mentioned here. Carl Maximowicz, the great Russian scholar, author, botanist, and explorer for plants, who wrote the first intimate account of the flora of Japan and who was also the first to introduce living plants to any extent to Eastern Europe. Through the Botanical Gardens of Petrograd some of his choicest plant introductions from Manchuria, China, and Japan, found their way to our western gardens. Notable among them were several lilies.

The two greatest Frenchmen of this time were missionaries, sent out to the interior of China—M. l'Abbe Armand David, a priest of the Society of Lazarists, and M. l'Abbe Jean Marie Delavay, belonging to the Society of Foreign Missions.

From 1863 to 1874 L'Abbe David, journeyed uncountable miles through the interior of China, Southern Mongolia, and Eastern Tibet, and the scientific fruits of these travels are counted among the most important of modern times. If for nothing else David's name would be always famous for his discovery of the *Davidia*, which bears his name, as well as for the first discovery of rhododendrons in Western China. He opened up the country since made famous by Farrar, Wilson, etc. Delavay followed David's footsteps and, encouraged by the great French botanist Franchet, collected and sent back to Paris hundreds of specimens not only of rhododendrons, but of a vegetation almost entirely unknown to science. David died in Paris in 1900, seventy-five years old, Delavay died in Yunnan, China, in 1895, only 57 years old, broken in health by the plague which attacked him in 1888, and from which he never entirely recovered.

The fourth of these great explorers of the late Victorian era, and probably the greatest of all, was Robert Fortune, a Scotsman born in 1812 and who died in 1880. Fortune made four notable collecting trips, the first for the Horticultural Society of London (now the Royal Horticultural Society), the next two for the East India Company and the fourth his own private enterprise. His adventures, detailed in his four books, are exciting and hazardous to a degree, and, as before mentioned, in order to penetrate into the fiercely hostile regions of Tibet and Yunnan,

he was forced to assume the disguise of a Chinaman . . . which of itself speaks volumes, since only time and intelligent familiarity could assure proficiency in a role so difficult.

Fortune brought to England the greatest number of new plants of any known collector—190 species, 120 of which were entirely new to the botanical world, while the number of varieties ran into enormous numbers. This was due, of course, to the fact that he antedated even his contemporaries in being the first to tap the fabulously rich fields of unknown regions of Eastern Asia.

For almost an even hundred years his introductions have stood at the head of garden material even to the point of losing their identities as foreigners, deutzias, *Viburnum tomentosum*, *Akebia quinata*, roses, camellias, *Citrus japonica*, forsythia, *Jasminum nudiflorum*, *Chionanthus retusa*, are but a few of what we call common shrubs. While *Anemone japonica*, *Toronia color*, moutan peonies, azaleas, clematis, chrysanthemums, and so on ad infinitum, stand as eternal monuments to his memory. Perhaps his name is seemingly obliterated for the average gardener, but his own stories will live, and in the revival of interest in the origins of garden material which is bound to grow, Fortune will ever stand where he rightly belongs, at the head of that great army of plantsmen to whom we owe our present day garden beauty, and whose names in all justice to their gallant lives, cannot be allowed to sink into oblivion.

Edible Weeds

HELEN M. FOX

TODAY with a large part of the world's population either starving or close to it, edible weeds have a timely interest.

Many palatable plants are eaten by very few, while others are eaten in certain localities only. Yet a large proportion of ignored or neglected vegetables have a high content of vitamins, starches and salts. Though the enterprising housekeeper may find it amusing to vary the family menu with cooked nettle greens, or soups of portulaca or sorrel, she may hesitate to grow weeds, for there is likelihood of their spreading from neat rows in the vegetable garden into the flower beds or fields of grain, unless carefully watched and tended. However, edible weeds could be picked from fields and roadsides and brought to markets if there was a demand for them. This would serve two purposes, to keep the weeds down and supply nourishing food.

In looking up the subject of edible weeds I came upon a book, "Les Plantes Alimentaires Chez Tous Les Peuples a Travers Les Ages" by D. Bois, which includes almost every plant eaten by man at one time or another; "Weeds," by Walter Conrad Muen-scher and "Notes on Edible Plants," by E. Louis Sturtevant. Besides, there were books and pamphlets on medicinal plants and a report entitled "Some Edible Potherbs and Salad Plants in New York State," by the Domestic Science Department at the New York State College of Agriculture.

Many of the weeds—as was true of daisies and buttercups which did not paint the fields with yellow and white before the sailing of Columbus—reached these shores in the hay bedding of animals, crowded into the little ships

with the first settlers to cross the Atlantic. Other weed seeds may have come to southwestern coasts in outrigger canoes, or to the east with tenth century viking visitors. Once they reached the land it did not take them long to become established.

Among edible weeds are salad plants, greens to be cooked as pot herbs, edible roots, seeds and young stems, or leaf buds which are cooked like asparagus.

If it were not that the dandelion ruins lawns, it would be considered a most desirable perennial, because of the cheerful beauty of the bright yellow flowers followed by silky seeds, each in the form of a parachute, and all together forming a transparent balloon borne on hollow stems, rising from a rosette of pinnatifid leaves. At the first breeze the seeds float away to rest on a bare spot, generally in a lawn or meadow. To get rid of the plants, the crowns should be cut well below the soil level—a good tool for this is an asparagus knife. Into the hole a few drops of sulphuric acid or a pinch of ammonium sulphate finish off the plants. Some think dandelion, *Taraxacum officinale*, was introduced from Eurasia but others that it is native to America. Bois mentions cultivated forms. The greens should be cut before the first bud is formed so they will be tender. They taste bitter and as salad are best with blander greens such as lettuce or Romaine all cut into pieces and served with French or some other dressing. The American Indians combine the root with other plants to make a tonic.

Roripa nasturtium-aquaticum, Water Cress, is a European plant but has escaped and spread itself in America from Nova Scotia to Georgia and west to

Idaho and California. It is so widespread, I once saw it almost choking a stream in a remote valley in New Mexico. The antiscorbutic qualities of water cress were well known to the Greeks and Xenophon recommended it to the Persians, while Romans considered it a cure for deranged minds and in India it was valued by Mohammedans. Stems and leaves float in water which must be clear and running. The small white flowers grow in elongated racemes. Bois recommends cultivated forms as better than the wild and says wider leaves taste pleasanter than narrow. When there is no stream on the farm, cress is grown in long ditches. Either seeds, cuttings of roots or stems which root at the nodes, are planted in the bottom of the trenches. As the plant grows in height, the water is gradually let in, until it is five inches deep. Cress lends a peppery taste to salads and soup and can be added to spinach with a little mint and rosemary to give this otherwise mildly tasting vegetable a tang.

Originally from the lands where Alexander the Great marched his army, is *Portulaca oleracea* with the popular names of Purslane or Pussley. It has been a potherb in Europe for centuries where the young stem and leaves are either prepared as a salad or cooked, sometimes because of their slightly acid flavor as a substitute for sorrel, in soups. China and India, it is popular as it is in Mexico where it is on sale in the markets, but it is becoming less popular in Europe and is rarely eaten in the United States where, according to Bois, it was growing before the advent of Columbus. Purslane was used as an antiscorbutic by the explorers Cook and Baron Mueller. John Evelyn, who gardened and cooked in the time of Charles the Second in England, wrote of sorrel in his book "Acetaria,

a Discourse on Sallets" as follows:

"Purslain, Portulaca; especially the golden whilst tender, next the Seed-leaves, with the young Stalks, being eminently moist and cooling, quickens Appetite, asswages Thirst, and is very profitable for hot and Bilious Tempers, as well as Sanguine, and generally entertain'd in all our Sallets, mingled with hotter herbs: 'Tis likewise familiarly eaten alone with Oyl and Vinegar; but with moderation, as having been sometimes found to corrupt the Stomach, which being Pickl'd tis not so apt to do. Some eat it cold, after it has been boil'd, which Dr. Muffet would have in Wine, for Nourishment."

Portulaca is annual, and grows in cultivated places. The prostrate stems are much branched and in no time, a tiny reddish sprout becomes a wide mat of reddish stems with small yellow flowers in the axils of the succulent leaves. The cultivated form is more erect than the wild and there is a form with yellow leaves, mentioned by Evelyn. However, I would have to be hard put for vegetables before I would introduce it into the garden, it is such a rapid spreader and seeds itself so widely.

So beautiful is chicory it would be in every border were it not for its invasiveness. *Cichorium Intybus* is also known as Wild Succory, Blue Sailors, Blue Daisy, Coffee-Weed and Whitloof Chicory. It comes from Eurasia and has been naturalized in North America where its tall straggly stems, almost bare of leaves carrying composite flowers 1½ inches across, of a lovely pale blue, can be seen along roadsides and in meadows. There is a white flowered form and one with flowers a dainty tone of pink. However, as with Morning Glories and Rock Roses, they close at noon. The root is a tap root, and the basal leaves look as if they had been

gathered along the center for they pucker on either side. They grow shorter as they ascend, the hairy, hollow stems. The leaves taste bitter, nevertheless they have been eaten as a salad since earliest days. The roots when ground and mixed with coffee make it darker and intensify its bitterness. The roots are also used medicinally. When they are to be forced they are lifted, set in a trench and covered, so the young leaves will come up blanched and tender. This is not endive which comes from *Cichorium Endivia*, known to cultivation since the Egyptian dynasties.

A perennial which increases into clumps is *Rumex Acetosa*, Sour Dock, Garden Sorrel, Meadow Sorrel, Tall Green Sorrel. It is found in meadows and old pastures and is abundant in north Atlantic states. The stalks, tinted red, are ridged and sometimes twist. They bear lanceolate, wrinkled leaves, clasping at the base, and terminate in a reddish branched flowering spike, which only the seeker after the strange, could call attractive. In my garden it has grown two feet high but is said to reach another foot. To have a continual supply of edible leaves I cut the flowering spikes. Sorrel also furnishes the green for a delicious cream soup.

This sorrel is not the much smaller *Rumex Acetosella*, Field, Sheep, Red Top or Sour Grass, from Eurasia and now common throughout North America. It has been used for soup and sauce. Bois recommends growing male plants to prevent them from seeding and I recommend growing *Rumex Acetosa* which is not a troublesome weed.

The thought of eating nettles recalls the story of the Thibetan saint, Milarepa, who ate nothing else and gradually acquired a green look. It is one of the five bitter herbs eaten by Jews at Passover, and has been cooked for

greens in soup, put into meat puddings and bear and brewed as a tea since earliest days. Bois writes, before the last war it was sold in Russian and French markets. American Indians eat it too. The stinging quality on the spines is due to bicarbonate of ammonia which evaporates with heat during cooking. It is said dock is an antidote to the sting of nettles and an old rhyme about this runs

"Nettle in, dock out
Dock rub nettle out."

Another rhyme
"Tender hearted grasp the nettle and it stings you for your pains
Graps it like a man of nettle and it soft as silk remains."

Rosemary and sage, leaves are also supposed to be antidotes for the sting. Some used the sting medicinally to cure rheumatism.

Nettle, *Urtica dioica*, is perennial, comes from Eurasia and is now widespread in the eastern states. The stems are three to six feet high, ridged and bristly with stinging hairs. The leaves are opposite, ovate, heart-shaped and the flowers small, greenish and in spikes. Eleanor Rhode writes: "To make a nettle spinach—boil the young nettle tops in as little water as possible and when sufficiently cooked, rub through a sieve."

And now comes the group of weeds, the tender young shoots of which, can be cooked like asparagus. One of these is Milkweed, *Asclepias syriaca*, of the roadsides and fields, from New Brunswick to Saskatchewan, and from Kansas to South Carolina. Peter Kalm, the Swedish naturalist and pupil of Linnaeus—for whom *Kalmia latifolia*, Mountain Laurel, was named—when visiting the American colonies found French Canadians cooking the tender stems and young pods and eating them with buffalo meat. It is also reported,

Indians ate pods and stems of Butterfly-Weed, *Asclepias tuberosa*, which flaunts its brilliant orange flower heads from the Great Plains to the Atlantic Coast. The shoots of *syriaca* can be eaten only while young enough to snap when bent, later they are filled with milky juice and too tough. *Asclepias syriaca* grows from three to six feet high, has sturdy stems, oblong leaves, tapering at tip and base and numerous purplish flowers in globular umbels.

Native from Maine to Florida and south to Mexico is Pokan, Scoke, Virginia Poke. Pokeweed is botanically known as *Phytolacca americana*. The Indians ate it and in the south, colored as well as white folk eat the shoots prepared like asparagus. Writers reported them in French markets of Louisiana in the early nineteenth century and in Philadelphia. This weed has reversed the usual order and escaped from America into Europe. There the juice of the purple fruit formerly colored pastries and sauces and in Portugal, for a while, the wine. Pokeweed grows twelve feet high and has a strong smell. The leaves are oblong, the flowers first white, fade to purple and the purple fruit is one inch in diameter and crimson with juice. The shoots should be boiled in two waters to dissolve the acid which is a strong purgative and used medicinally in the United States.

The sprouts of two Bellworts, *Uvularia sessilifolia* and *perfoliata*, American members of the lily family, and woodland plants with slender leaves and stems topped with drooping pale yellow flowers are edible as are the sprouts of *Smilacena stellata*, False Solomon's-Seal, False Spikenard or Treacle Berry. The arched stems of False Solomon's-Seal clothed all the way and evenly, with alternate sessile leaves are bent forward by the weight

of the creamy panicle of flowers at their tip. The fruits are pale red, speckled with purple and are edible and, according to one authority, taste like treacle, keep for a long time, are wholesome and have medicinal virtues.

It is difficult to imagine eating the young sprouts of *Arctium Lappa* but Gerarde wrote "the stalk of the clotburre before the burre come forth, the rinde is peeled off, being eaten raw with salt and pepper or boiled in the broth of fat meat, is pleasant to be eaten." And Kalm writes when he was in Ticonderoga "the governor told me that its tender shoots are eaten in the spring as radishes, after the exterior part is taken off." In Japan, the burdock is cultivated for the tender stalks, and roots. However, another authority says the root is tasteless, hard and fibrous. *Arctium Lappa* is biennial or annual and has popular names reminiscent of the English countryside, Beggar's Buttons, Clotbur, Cuckold, Harlock and Cockle-Button. It is native to Europe and Asia and naturalized in America where it grows in neglected farmyards for it thrives in rich soil. From a tap root, grows a large rosette of leaves and the stems are erect, hairy and three to nine feet high. The stem leaves are hairy below, alternate, simple and with slightly frilled margins. The purple flower heads are in axillary corymbs. The overlapping flower bracts are hooked at the tips and form a nearly globular bur. Ray florets are absent.

To avail oneself of edible roots of weeds growing along roadsides one needs a spade or a trowel.

At first coming from Europe, but now found wild in meadows, roadsides and waste places of North America is *Tragopogon porrifolius*, a hardy biennial of the composite family, popularly called Oyster-Plant, Goats-Beard,

Noon-Plant and Jerusalem Star. The stem rises from a fleshy grey tap root, is erect, branched and smooth and has a milky juice. The leaves are alternate, clasping, and narrow and in the vegetable garden one has to look at them twice to distinguish them from leeks. The flower heads are solitary, and terminal with many purple linulate flowers which close at noon. Oyster-Plant has been cultivated since 1600 for its roots which are delicious either fried in butter or boiled and served with cream sauce. Seeds are sown fairly early in spring for it takes a long time for plants to mature. The roots are harvested throughout the winter where the ground does not freeze too deeply.

Helianthus tuberosus, Jerusalem Artichoke, was first seen by a European on July 21, 1605 at Nausett Harbor, on Cape Cod, when Samuel Champlain and his expedition, led by Seigneur de Monts, visited the homes of the natives. On their way, they passed through fields of Indian corn and saw an "abundance of Brazilian Beans, many edible squashes of various sizes, tobacco and roots which they cultivate, the latter having the taste of artichokes." The Indian name of the plant is Kaischuc-penauk, said to mean sun and roots. But through a series of more or less involved occurrences the plant has the name of Jerusalem Artichoke, inappropriate, since it is neither an artichoke nor comes from Jerusalem. Originally the name was thought to be an anglicizing of the Italian, Girasole, but lately the theory has been propounded that the name is a popularizing by English hawkers of Van der Neusen, in Holland, where the plants were grown. The plants are perennial, grow twelve feet high and have ovate-oblong leaves eight inches long with toothed margins and rough upper surfaces, while the composite flowers have yellow disk and

yellow ray florets, are three and a half inches across and borne in clusters. They grow in any soil but the richer the earth, the larger the increase of tuberous roots under the ground. One tuber generally produces six new ones a year. Because of the rapid increase, the plants are a nuisance in most gardens. However, today in England, they are highly valued for their food content and their culture is encouraged. *Helianthus tuberosus* has 360 calories in comparison with 385 of the potato, twelve percent more nitrogenous substance and fifty percent more fat and minerals. It contains as much Grade 1 protein as the potato and in spring has inulin, an enzyme which converts fruit sugars into fructose, a sugar lacking in wartime England. The tubers make a good thick soup with grated young carrots and sliced onions or can be cooked as a vegetable.

The largest percentage of edible seeds comes from grasses but there are other plants furnishing them as well. One of these is *Chenopodium album*, Pigweed, Lambs-Quarters, Baconweed, also White Fat Hen, Mealweed and Frost-Blite. Remnants of the plants were found in the debris of the prehistoric villages along the lakes in Switzerland. In America, young tender leaves and tops, as well as seeds, are collected by Indians of the southwest who either boil them or eat them raw. Seeds gathered by some of the tribes are ground into flour for a bread or mush. The plants are annual and introduced from Eurasia. They have straight, ridged, branching stems, alternate simple leaves without stipules and with a few teeth along the margins. The flowers are small green and in irregular spikes, clustered in panicles.

Seeds are gathered from two other weeds. The first is Mustard, *Brassica alba*, now cultivated extensively for this

purpose in California. The yellow flowering spikes are a cheerful sight when they appear in cultivated fields early in spring but they signify poor husbandry. In India mustard symbolizes generation and the seeds are said to render women fertile. American Indians made poultices of the leaves for pains and swellings, similar to our mustard plasters which are made from ground seed. All grownups of today remember the mustard foot baths of their childhood as a cure for cold.

A third weed which furnishes seeds is *Amaranthus retroflexus*, Amaranth, Pigweed, Green Amaranth, Red-Root. According to Cornell, the water of the cooked leaves, which are edible, makes

an excellent soup. The shiny black seeds of this and other amaranths were formerly parched and ground into meal which was baked into cakes or used for porridge. The Indians cultivated the plants for the seeds. The leaves are so bland in taste one is advised to cook greens with a stronger flavor along with them.

These are only a few of the edible weeds people could gather for nourishment if they had to. Since taste changes and people eat different food in different centuries, undoubtedly in time, some of the weeds which have not already done so, will enter the kitchen door and become part of the weekly menu.

The Ups and Downs of Tulip Bulbs

MARY M. SELDEN

Progress in all branches of horticulture particularly toward simplified care brings attention to some new ideas on long time management of tulip plantings. For several decades past an important part of the cultural directions for tulips has been to dig them *up* every year or so and replant the survivors rather than to leave them *down* permanently. In the extravagant 1920's many a garden was expanded with no thought of upkeep. Later scores of tulip plantings established on the yearly renewal basis came to grief when the 1930's tightened our purse strings with a consequent reducing of labor.

Today many gardeners are finding that under certain conditions groups of tulips established in borders will continue for years undisturbed with but little care, giving color to the spring-time picture. This does not mean that show-sized blooms in a display bed will be indefinitely maintained but it does mean we have plenty of flowers for cutting and sections of large borders may be enhanced early in the season before late perennials develop or annuals fill in to cover the departing foliage of early bulbs.

Years ago, to my quest for advice on the best management of several tulip plantings in our garden, such contradictory opinions were expressed by various successful gardeners that it became evident I must try out the different methods and decide for myself.

Beginners in any line of endeavor are eager for a set of hard and fast rules to work by but the seasoned gardener realizes perhaps more clearly than anyone else that exceptions for outnumber if not outweigh the rules. It may be that the information acquired in search of a practical rule for tulips extending over a long period of years

in a rambling old garden and through many shelves of books will help other enthusiasts to a decision on handling their bulbs year after year.

There is, of course, hardly any problem about the tulip's first season if we think in terms of one year only provided the bulbs come from a reliable dealer and were planted with any rudiments of garden sense. The following words are written neither for the indifferent and heartless person who leaves the bulbs neglected to be devoured by mice or grubs, injured by disease and finished off by careless spading, nor yet for the extravagant management that discards the bulbs after one blooming and replaces them annually without giving the poor dears another chance in anybody's garden, but for the reader who proposes to continue to enjoy his collection of tulips in spite of the fact that garden maintenance must be kept within certain bounds.

There are two main schools of thought regarding garden tulips. One would dig them up after the foliage ripens in early summer and store them until time to replant them in the fall. The other school believes that if the bulbs are very deeply planted they can be left down indefinitely to bloom undisturbed. These two opposite systems confuse the beginner who often tries for a middle course without understanding the whys and wherefores and is disappointed in the result.

I hope to make clear why certain sequences need to be followed with either general system; for an understanding of essentials enables one to adapt methods successfully to many varied conditions.

We will first consider the "Up every year" idea which is the one advocated

by professionals. In Holland, the land of commercial tulip culture, the growers strive to produce annually a large crop of healthy bulbs that will yield maximum bloom the season following sale. To this end a vast amount of labor and supervision is expended. I cannot give you a first hand account of the professional Dutch methods but I can assure you that from the reports of experts who have studied them recently, we in America have much to learn. According to Mr. R. M. Carleton tulips are grown in Holland "largely on siliceous sands heavily impregnated with lime." Careful scientific analyses of these bulb soils have been made to determine their fertilizer content and they were found so low in organic matter that exact quantities were determined with difficulty. Furthermore, the level of the water table is artificially maintained at about two feet below the surface, giving constant moisture with perfect drainage for the bulbs which are seldom planted more than six inches down.

To illustrate their use of fertilizer we will classify roughly in three groups the bulbs taken out of storage to be handled in the fall after disposal of the saleable crop:

- (1) Those for "finishing" for sale next season.
- (2) Those to use for further propagation next year.
- (3) The splits and small bulbs to develop further.

According to reports these growers use no fertilizer at all in their sandy tulip beds to prepare or "finish" the bulbs for export. Those slated to increase the stock are given a small amount of inorganic fertilizer with an analysis of about 5-8-6* to stimulate

division or splitting. Otherwise even to develop small bulbs and splits a negligible amount of fertilizer is used compared to the accepted practice in America. As lime is abundant in the favored Dutch bulb soils due largely to the disintegration of sea shells, it is evidently important to use more lime over here than has been the usual custom.

It appears that in commercial plantings here or abroad the blossoms are carefully picked before the petals wither to prevent seed formation and the spread of "fire" disease. In this process the stem and leaves are not removed. In fact, injury to the leaves even to the extent of tearing or bruising is avoided which reminds us that protection from high winds and rough handling either by awkward people or frolicsome pets is equally urgent in gardens. An excellent and full account of the American professional bulb growing, invaluable to amateurs, is given in the pamphlet by David Griffiths entitled "Tulips."† Briefly, the digging up process is as follows: When the bulbs have ripened, as indicated by the degree of withered foliage, they are dug, cured (partially dried), cleaned, sorted and stored. To insure success this process must be followed through, as it is in routine fashion in a commercial planting but how about the home garden? For a few dozen bulbs this is no trick at all. For several good sized plantings of different varieties it is much more of an undertaking than most amateurs will care to cope with. Many disasters may overtake this process in a garden. My worst catastrophe occurred after several hundred bulbs were dug, carefully labelled, laid in flats and these stacked in a tool shed pending removal to a suitable place to cure. At this juncture something happened to call me away as I

*For convenience the composition of a mixed fertilizer is expressed in figures. The first always represents the percentage of total nitrogen, the second the percentage of available phosphoric acid, and the third figure the percentage of water soluble potash, hence 5% Nitrogen, 8% phosphoric acid, 6% Potash. (5.8.6.)

†This may be obtained from the Superintendent of Documents, Washington, D. C., where it is listed as U. S. Dept. Agriculture Circular No. 372.

supposed for a few minutes only. I neglected to tell the gardener to separate the trays and leave the shed door open for ventilation. Other events beyond the precinct of the garden piled up to distract me and for several hot humid days the bulbs were forgotten. When I returned it was to find they had cooked themselves to the consistency of boiled onions!! "Careless" you may say, yes, and it would not have happened in professional handling but is cited among the pros and cons when deciding on a plan of action for the amateur.

The Dutch grower, having sold his marketable product, now takes the remaining bulbs out of his warehouse to be stowed away in the fall five or six inches below the surface in their carefully prepared beds. I have already given an idea of the soil conditions in the Holland bulb district particularly regarding the use of inorganic fertilizers in the development of the bulbs through their different stages. This is quite unlike the customary methods in this country. Both at home and abroad, however, tulips are grown commercially on the same land only once in three or more years. This rotation of crops aids in keeping the land in a top notch state of cultivation. This may sound far afield from the home garden, its lesson is not. The steps of the process of cultivation are better known than the reasons for them. Turning over the ground to the depth of a foot or more discourages grubs and moles as well as improving its tilth. We have been taught that earth worms benefit the land by helping to aerate it. We also have been advised that shallow-rooted plants may be used over bulbs beneficially. A weed in one country may be a choice plant in another. Weren't purslane and dandelions carefully imported to this land of the free by the

early colonists for their herb gardens? We are tempted to leave them sometimes. Just where, after all, does this weeding and rotation lead us in the home garden? In the first place organic fertilizer, particularly well rotted cow manure which is a favorite diet of earth worms, is a gilt-edged invitation to moles, earth worms, white grubs and their ilk, also to plants with predatory roots. This invitation may be roundabout but it arrives just the same often by the circuit of encouragement to weeds especially quack as well as the better mannered grasses. Did you ever find a choice tulip pierced right through the heart of the bulb by a root of quack grass? I have several times, more shame to my gardening. (I will say this, it has always been where the bulbs were less than eight inches down). Grass roots are the favorite diet of rose chafers and May beetles in their underground phase and there are many other inhabitants of the earth that flourish among the roots of things where they are not wanted. The moles hurry around and about the well prepared tulip planting, loose friable soil making easy work of their tunneling in search of a dinner of earth worms. They must do away with many of the grubs too that have been taking ugly bites out of the tulips but alas these moles are not entirely helpful for their tunnels pave the way for mice, field mice, pine mice, all sorts of mice. Though I have never caught any of them underground at work on bulbs I have seen several kinds in the garden and found unmistakable traces of their eating the bark of the roots of trees nearby and proof that they have devoured tulips left unguarded in summer storage.

Once the protecting brown jacket of the bulb has been perforated, the bulb inside is vastly more susceptible to disease that may be lurking about and

when large gouges have been bitten out of it the bulb has a sorry time. So here we have it; soil full of humus, fat tulip bulbs at a convenient six-inch depth undisturbed for two or three seasons, weeds and grass, grubs and earthworms, moles and mice, nibbled and sick or completely devoured bulbs, disappointed and unobserving gardener, new bed, new tulips, more fertilizer and the vicious circle starts again.

There is no need to be ruffled or discouraged at warnings of pitfalls. Quite the reverse. We have a far simpler course to steer when we can see where the rocks lie and where the shoals are and what they will do to us.

The yearly round of planting and digging and replanting is accepted routine of commercial growers and while most of the directions that come with the bulbs follow such a general outline it is not always easy or possible for the home gardener to follow through the system as does the man who makes bulb growing his business, however, it is apparent that in the garden where there are ample facilities for storage, plenty of space for rotation, lots of labor, hand and foot as well as head, the "Ups" have a strong case. There the tulips may be planted six inches deep in fresh sandy soil in full sun with plenty of lime and the desired amount of fertilizer and watering in the spring. After flowering when the bulbs have thoroughly ripened they may be dug, different varieties separated into flats or trays with their labels. The next steps are to cure, clean, sort and store in a temperature less than 70 degrees where the bulbs are dry and airy enough not to mold and damp enough not to wither. There they may stay safe from mice and squirrels until planting time again.

So much for the "Ups" under ideal conditions.

Let us hear from the "Downs."

We learn of instances where tulips have persisted undisturbed for sixty or seventy years in old gardens. Mr. Alfred Bates in his gratifying and informative article "Tulips for Permanency" in the July 1937 number of THE NATIONAL HORTICULTURAL MAGAZINE mentions such a case of longevity with deep planting and without benefit of fertilizer. Again, Rev. H. Kingsmill Moore in his delightful book "Joys of the Garden" writes of tulips blooming well that were left in the ground in Ireland for some years at a depth of eighteen inches. I have watched patches of tulips blooming in old gardens without any care whatever for many a year.

It is plain that given a suitable location tulips persist happily for a long time without effort on the gardener's part. What then is a suitable location? All sorts of factors make up different combinations in different gardens. It helps to understand the meaning of this success and that failure if we remember that the delicate bulb we plant in its brown packet expends itself in leaf and blossom the following spring. It then renews itself from the nourishment derived through the roots and assimilated through the leaves. When ripe it has become a whole new rudimentary plant and food storehouse. It is vital that the leaves and roots be allowed to function unhindered if another season's performance is wanted. When the stem is broken off at the ground before maturing the bulb cannot survive. If the leaves are torn by wind or careless weeding it may allow the mysterious "fire" to damage the plant.

For years I watched the bloom of a few Pride of Haarlem bulbs planted 8 or 9 inches down between a small pine tree and a forsythia bush. In a planting of ten or a dozen bulbs some can be depended on to choose those years to

go through their cycle of increase while others are blooming. There was at least one flower from this group each year for twenty-five years with nothing done to the bulbs. However, they were in a sheltered position in sandy soil, full sun in the morning. In some years there were more flowers than others, sometimes the flowers were few and large followed by a season of small and numerous ones. Generally there were all types of leaves, from the usual stem with its two or three, to the many crowded small leaves and the big broad floppy ones that indicate a bulb is in the process of developing from a split to a mother bulb. Evidently there were continuously some bulbs in each stage of development after the first year. There was no evidence of garden pests nearby although there were plenty a few rods away. Lime and sand were naturally abundant where these bulbs continued to flourish. I am convinced that our tulips can hold their own with the roots of any but the most aggressive shrubs if planted on the sunny side. Finally the tulips were taken up to be placed elsewhere. I have no record of what was found when they came out of the ground. This incident is mentioned merely to record a happy combination—bulbs, sand, lime, sun, practically no fertilizer and many years of tulip bloom with no slightest effort on the part of mere man. I believe more people would plant tulips if they did not think them either a lot of bother or quite temporary, hence expensive.

I can tell of another instance of the staying qualities of those bulbs and the garden conditions where they persisted.

This garden with which I am familiar slopes gradually to the southwest in a limestone country. It has been under cultivation for nearly a hundred and fifty years. The soil ranges from highly fertile sandy loam full of humus to a

stiff blue clay. It is a popular resort for practically all well-known garden pests from *Pitymys pinetorum scalopoides* to *Caconema radicola* and a few others!!! Although located in Zone 5 of the nursery planting tables it is subject to winds in the spring that rival Mount Everest's. I have no doubt there are many combinations of soil and circumstance that I have not met but I have watched carefully a varied lot of procedures with tulips under the limits described.

Down a slope in this garden part way beside a nearly solid fence wandered a perennial border nine rods long. At the upper end the soil was poor, stiff and dry, lower down quite different conditions prevailed. A tiny stream from springy land beyond crossed well underneath the border in an ancient tile drain. The top soil from the upper border gradually washed down developing a rich mellow clay loam which encouraged most luxuriant growth. Twenty-odd years ago a carefully worked out color scheme in Darwins was planned with about fifty of a variety in each group. It was planted along the whole face of this border between and in front of perennials. The bulbs were set six inches down in soil amply enriched with well-rotted cow manure. It was expected by an inexperienced gardener that after giving them a good start they would fend for themselves successfully without much further labor. For five or six years there was glorious tulip bloom and no further attention was given other than picking the flowers. The fence and hollyhocks afforded protection from prevailing winds and afternoon sun. Annuals often self maintaining covered the fading foliage where perennials did not overlap. After a few more years the flowers became small and scarce, the leaves indicated the bulbs at the

upper end of the planting were splitting. Abundant mole runs warned that bulbs were being destroyed.

A year ago over twenty years after the tulips were planted the whole border was revamped though there was still enough bloom from the bulbs to make charming color in May along the lower end. When this part was taken up it was found that many bulbs had disappeared entirely and those remaining were mostly a foot down. Whether these were all droppers (some definitely were) or whether the upper ground washing down and raising the surface level was responsible I cannot say, but down deep they were apparently out of reach of mole runs and grubs. There was by then a distinct lack of both lime and fertilizer in this soil however they were poor but healthy, were wearing their old jackets and each year for some time had made new jackets inside the old ones till there were as many as seven or eight brown coats intact, one inside the other. These dwindling bulbs still healthy though small presumably were flowering as there were blossoms in that section the preceding spring. No splits appeared and few tiny round bulbs.

On the higher ground they had not fared so well. Here they were only three or four inches down, in easy reach of mice and grubs and often pierced by quack roots. They were beyond the protection of the fence from wind and sun and scurrying feet, in far drier hotter ground. They had split and split and split again, each bulb forming a twisted crowded cluster. There was neither space nor food to encourage development of individual bulbs. All except the very smallest showed evidence of disease following what looked like bites of grubs more than tooth marks of mice, some were more than half eaten through. They

were as sorry looking a lot of bulbs as anyone could expect to see. This part of the experience by itself would certainly discourage a person from leaving tulips underground and is cited merely as an example of what happened under given circumstances. After sorting them all over many bulbs were discarded, those only slightly sick were dosed with formaldehyde and sulphur and planted deeply with the healthy ones, regardless of color but according to size, in a special bed to recuperate. I await with interest their performance the next few seasons.

In the revamping process the old border was filled in five or six inches deeper over the lower end after the bulbs were supposed to be all out. Grass was planted adding lime and peat moss. To everyone's astonishment up through the grass came many roistering tulip leaves in the season following. The promised flowers arrived the next year from the bulbs missed in the renovating and digging processes. It looks as though tulips would persist if they were happy and deep doesn't it?

So here is the case for the "Downs":

Groups of several bulbs each,

Deep planting in heavy loam, deeper in sandy solid,

Moisture with drainage,

Protection for the ripening foliage,

Sun part of the day,

Cut flowers (but at least two leaves left on the plant),

Lime dressing every three or four years.

Inorganic fertilizer once in five or six years or when flowers grow too small. Otherwise, leave the bulbs in peace and reap large crops of enjoyment.

For those of us with a garden, but with strict boundaries to time, labor and pocketbook the "Downs" win.

Elm Place, Avon, N. Y.



1. *A Southern Pottery.* 2. *Chinese Jar.* 3. *Fiesta Salad Bowl.* 4. *Galway Pottery.* 5. *Italian Pottery.* 6. *Swedish Pottery.* 7. *Unknown.*

Pots for Plants

ALFRED BATES

When one confines his gardening to the growing of plants in an apartment or a house, he has to meet two difficulties which are not present in out-door gardening. The first is suitable drainage and its opposite pole of prevention against the too rapid drying out of the soil. In the garden there is a large area of earth to conserve moisture around the plants' roots and the depth takes care of proper drainage—that is if the border or bed has been properly prepared. The second point is to provide attractive containers for the plants in order to show them to best advantage. In the garden each plant has a background formed by soil and rocks and verdure; but indoors the potted plant has only the frame of the window and the window sill. Our common clay pots have not the graceful outline nor the softer shade of color which

the English pots possess. Our pots are usually not baked hard and so have the disadvantage of rapid evaporation and because of the soft baking salts remaining in the clay have a tendency to discolor the pot unless constantly scrubbed.

Placing the potted plant in a jardiniere produces a pleasing effect to the eye but is not so pleasing to the plant; for unless a very careful watch is kept water collects in the jardiniere and the plant's roots have to struggle through a sodden soil which eventually produces a dying plant. Years ago I discarded the use of jardinieres and began to collect glazed pots with drainage holes in the bottoms. This was fairly easy to do some ten or fifteen years ago for at that time potteries were still making jars with drainage holes and saucers to match in graceful shapes and in a

good selection of colors. But shortly after that some inventive genius on the wrong side of the fence had a bright idea; he invented a pot and saucer in one piece—a drainage hole through the bottom of the jar and with several slots leading from it through the walls of the pot into the saucer. These were tried with disastrous results; for the small slits into the saucer became clogged easily and so prevented proper drainage. This trap for the lazy plant grower is still on the market but a jar with a drainage hole, either with or without a free standing saucer is now as scarce as the first edition of Homer.

The plea is made for the holeless jar that if one puts in a good layer of broken crocks at the bottom and waters carefully the plant will grow all right; there is no need to mince words, this is a down-right lie. Sooner or later the plant dies because its roots are in water-logged soil. Potted plants must have free drainage if one expects them to remain healthy. This free drainage is still provided in the common clay pot; but these pots are very porous and the soil in them dries out quickly. Beside this objection, they should be scrubbed weekly in order to keep them clean and sightly; and even then they are scarcely objects of beauty in a living room window.

Years ago I came to the conclusion that holes could be bored in any suitable jar. This, I found, was not a difficult task provided one worked slowly and carefully. My first attempts were with jars of rather soft pottery but when I struck harder material I found it meant hours of tedious labor. After several experiments, I found that the most satisfactory tools were a sharp ice-pick, a brace and bit—the bit in this case being a steel drill—and a rat-tail file. All of these may be purchased from any Five-and-Ten, but at prices

beyond the dime limit in the case of the brace and steel drills. The only other tool necessary is a light hammer which surely every household has.

With this equipment drainage holes have been made in dozens of jars and pots and none have been broken or even cracked. As noted above, pots with a soft clay base and a light glaze are easy to work and of these the easiest are the inexpensive Italian potteries; the hardest are the stone-ware crocks and jars which a generation or so ago were used by housewives for pickles, apple-butter, etc., and the red terra cotta Japanese jardinières with a dragon design around them—these are by far the worst for their material is hard and compact which means many long hours of drilling unless one has access to an electric drill, but of this later on.

It is easier to work with the jar inverted, that is work from the outside of the bottom and not from the inside, for then one can see what is being done more clearly than if working inside the jar; also if there is any chipping away of the pottery, as is usual when the tool gets through the clay, the slopes so formed aid in the drainage. Therefore a wood block or blocks should be placed on the table or work-bench to a height slightly more than the height of the jar so the rim of the jar will be above the table when inverted over the blocking. This blocking must be tight against the bottom of the jar so that all pressure exerted by the worker will be made against a solid base. If an attempt is made to drive a hole through a jar which merely rests on the bench on its own rim and without any support directly under where the hole is being made, one is almost certain to crack the jar.

From this point on there are three methods of procedure; and each method is governed by the material of the

pot. First, such jars as have an indication of a drainage hole; evidently these were molded with the hole which was later filled before glazing. It is quite easy to restore this opening by the use of the ice-pick only. Hold the pick in a vertical position with the point resting somewhere along the circumference of the indentation (not in the center of it) and with the hammer give the pick a sharp but gentle tap. You may gauge the amount of force to be used by watching the effect of the blow; far better begin with too light a blow than too heavy a one. Aim merely to crack through the glaze. If the first blow does not make an impression do not strike again in the same place but move on just a bit further along the indentation and strike a little heavier this time. Continue around the indentation until a circle of the glaze has been broken through. Then go round again and again until the whole has been made. The hole will usually be found to be jagged and irregular and may then be evened up by filing gently with the rat-tail file. Do not try to force the file but work gently for too strenuous filing may split the jar.

The second type of material are pots formed from soft baked clay, that is clay which does not bake hard and close grained, and jars of thin walls such as most chinas. In these cases one may either mark a pencil circle on the middle of the bottom and work as directed above; or mark a point in the center of the bottom and, after forcing the pick through the glaze, carefully drill through the material. I have found that a quarter-inch drill works better than a larger size. After the hole is once made the rat-tail file is then used to make the hole any size desired.

In the third type of material, which are those jars and jardinieres with a heavy and thick clay base, or of stone-

ware, or of the very compact terra cotta of the Japanese ware mentioned above, one is up against real work. After an indentation has been made with the pick one must bore for hours and when the hole is through more hours must be spent with the file to enlarge the hole; but when once finished the pot will last forever and always be a source of joy.

In all but the hardest materials I take a special precaution against disintegration of the exposed clay base by painting the unglazed clay with "water glass" chemically known as sodium silicate. This may be had from any drug store at about fifteen cents a pint can. It fills in the pores of the clay as well as the glaze does. It is the old standby of the provident housewife for preserving a supply of fresh eggs against the time when eggs become scarce and costly. In passing let me sing its praise for other uses. Any flower vase or jar which has become cracked or never did hold water without showing a mark of dampness wherever it rested may be made perfectly sound and waterproof by its use. Have the jar perfectly dry and paint the bottom with it; allow to dry for at least a day. Then pour some of the liquid into the vase and swish it around until you are sure that all the inner surfaces near the crack is covered; if the opening of the vase is large enough to admit a brush, paint the surface around the crack instead of swishing the liquid over it. Should your jar still leak repeat the inside coating, for you have not completely covered all the cracked surface.

By this simple process I have brought back to usefulness many cherished vases and have waterproofed several new ones that had defective glaze. Our western Indian pottery which is so porous may be made waterproof by use of this liquid. But don't give me credit

for this discovery. Some years ago an English publication contained the story of a stone house built near the sea where a strong prevailing wind with heavy rain made one of its interior wall wet during the periods when it blew and of how the problem had been solved by applying a coat of "water glass" to the face of the stone on the side exposed; the application was applied during a dry spell and it filled the pores in the stone and so prevented any moisture from coming through the wall.

This digression has lead us away from our subject. Little more need be added except to say that if one has access to an electric drill most of the hard work will be eliminated. I have never used one myself but I have a friend who has a horizontal drill and who now bores all my jars for me. The operation is quite simple. Chip through the glaze at a point in the center of the bottom using the ice-pick as directed above; this locates the hole and makes a slight indentation for the drill to start through. With a wood block pressed against the inside of the bottom of the jar, hold jar against the drill firmly but do not exert any pressure to hurry the work for by so doing you may crack the pot. With an electric drill the hole is made in a much shorter time than by hand; however if the jars to be drilled are of thin material or of soft baked clay it would be better to do the work by hand for the rapidly whirling drill bites through the soft thin clay so quickly that there is great danger of breakage unless one is experienced in the work.

After one realizes that he is no longer under the domination of the present-day pottery maker but is able to make his own holes and in anything he cares to utilize he begins to see possibilities in many things which were not in-

tended by their makers for floral uses. Aside from the old stoneware jars and crocks used by our grandmothers for storage of anything from pickles to butter or salt and which have already been mentioned, there are other kitchen wares now made which may be converted into fine plant containers. I have recently picked up in a large department store several 5-inch jars of a good crockery-ware yellow with white bands around them at less than fifty cents a piece; they were evidently intended for frigidaire storage. From a cocktail and highball table of another store came a 4-inch high and 6-inch wide dark blue tub-shaped piece of pottery originally intended for cracked ice. Chinese ginger jars make effective pots but when once planted there can be no shifting of the plant into a larger pot for the curved shape prevents removal.

The greatest find has been the salad bowls made by the Fiesta Potteries; they are to be had in several sizes up to 10-inch diameter, are quite reasonable in cost and come in the following colors, ivory, aquamarine, yellow, dark blue, soft green and bright red. And for the fastidious window-gardener drainage saucers may be had to match by buying small plates or tea saucers, for this ware may be bought by the separate piece.

As to pottery whose original use was floral, cylindrical flower jars of wide diameter and those tall rectangular Chinese jars, one of which shows in the cut, make splendid pots especially for deep rooting plants. The deeper dishes which, for lack of drainage, have killed our once flourishing "dish gardens" may also be converted into usefulness. Before closing I must warn the reader against a certain unknown brand of pots marked on the plate "A Southern Pottery." I could not obtain from the store where I bought them any more

information than that. The illustration shows their very excellent shape but does not convey the lovely soft yellow, the exceptionally good jade nor the blended red and brown-red of their coloring. A free standing saucer came with each. After a year of use many of them are disintegrating both on the unglazed bottom and along the top edge where the glaze cracks badly. The first ones I bought are still sound but of the dozen I got on special order some have crumbled so badly that they

have been thrown away. It may be that the special order was rushed through and had poor workmanship. I am trying "water glass" on several of the less damaged ones, painting both the upper rim and the entire bottom in hope of saving them; it is quite annoying to be compelled to transplant a dozen of so plants that do not need shifting. This experience has taught this lesson: apply water glass to the bottoms of all soft baked jars as a precaution against disintegration.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

NATIVE NARCISSUS OF MOROCCO

Narcissus monophyllus (Dur.) Maire
var. *foliosus* Maire

This beautiful plant with remarkably pure white flowers belongs to the collective species *Narcissus Bulbocodium* (Trumpet Section).

This variety, usually found mixed with the typical form, has a very localized distribution at an altitude of 250 to 500 meters. It is found in the "Sokhat," an area of primitive quartzite rock outcroppings with more or less calcareous soil in the Chaouia region (western province of central Morocco). The plant is strictly a calcifuge.

The small bulbs are grouped in very dense clusters on the thickened layers formed by the rhizomes of the fern *Polypodium serratum* (Willd.) Christ., this itself being limited to humid fissures in the quartzite with northern exposure. In Morocco the flowering is very abundant during January-February. Among the same rocks the immediate associates of the *Narcissus monophyllus* are *Dianthus lusitanus*, *Scilla obtusifolia*, *Romulea Engleri* which also flowers in January, a few *Romulea columnnea alba*, *Ruscus hypophyllum*, the orchids *Gennaria diphylla* and *Orchis lactea*, and the magnificent fern *Cheilanthes hispanica*. These quartzite areas are also the exclusive home of *Erodium Moureti* with aromatic foliage, of *Spergula Pitardiana*, of *Silene mentagensis*, and the magnificent *Celsia Faurci* whose large flowers may cover an area of one to two meters; all of these species are endemic.

One can find also, but more rarely, colonies of *Sedum baeticum* var. *Gattefossei* (perennial), and an endemic grass *Tricholaena maroccana*. Shrubs are rare on this type of rock. We could

mention, however, *Cytisus linifolius*, *Cytisus arboreus* var. *transiens* and *Osyris lanceolata*. The most characteristic annual plant is *Sedum Jahandiezii* with rose-colored flowers.

Summer is the best time to collect the bulbs of *Narcissus monophyllus foliosus*. The clumps of the fern rhizome are broken off and, since the narcissus does not have any vegetation at this time, it is necessary to hunt for the very small bulbs; but they are easily distinguished from those of *Romulea* and the *Scilla obtusifolia*.

Many variations of *Narcissus Bulbocodium* exist in Morocco, apparently every mountain possessing an endemic race. These forms are usually known under the subspecies *vulgaris*, *obesus*, *albidus*, *praecox* and *Romieuxii*. The two last named are abundantly enough distributed to repay the labor of collecting.

Narcissus praecox Gatt. & Weiller, discovered in 1936, is a plant of calciferous plains. It blooms from September to January but does not withstand freezing. The flowers are very pale yellow.

Narcissus Romieuxii Br.-Bl. & Maire, found in 1921, is a plant, more or less calcifugous, of the Moyen-Atlas (forma *mesatlanticus*) and of the Rif area (forma *rifanus*). It grows in open places of the forests of Cedres at altitudes of 1,500 to 2,200 meters. The flower is a clear yellow but slightly darker than *Narcissus praecox*. It blossoms in April. The bulb is able to withstand four to five months covered with snow.

Narcissus serotinus L.

This is a small xerophytic species bearing one flower. It inhabits the

slopes of the arid meadows throughout all of Morocco at altitudes from 50 to 500 meters, principally in calcareous soils which are not very moist. It blossoms from September to November in colonies dense enough to form a white blanket. It is a characteristic plant of the *Chamaerops* association (*Chamaerops humilis*) or where the vegetation is rather unstable. Such areas include plants like *Cytisus albidus*, *Asphodelus microcarpus*, and *Ferula communis*. Bulbous plants abound in these terrains, especially *Urginea maritima* var. *stenophylla* which occupies an important place, then *Narcissus Broussonetii* and *Narcissus polyanthus*, *Pancratium oranense*, *Crocus Salzmanni*, *Romulea Engleri*, *R. bifrons* var. *rosea* and *R. ligustica*, *Iris planifolia*, *I. sisyrinchium* and its varieties, *Gladiolus byzantinus*, *Allium album*, *Urginea fugax*, *U. undulata*, *Dipcadi fulvum* and *Scilla linguata*; the last two being distinguished by their ornamental character.

The collection of *Narcissus serotinus* can be made by marking a colony during the flowering period, so that it will be easily recognizable after maturity of the fruits, that is to say, from April to May. Passing this period the bulbs are extremely difficult to find.

Narcissus elegans (Haw.) Spach. var. *oxypetalis* (Boiss.) Maire

A graceful plant with an orange-colored corona, a multiple-flowered stalk, and entirely indifferent to calcium. It grows in the underbrush of the plains at altitudes of 50 to 250 meters, but principally in clay soils of compact texture. It is very abundant in the northwest part of Morocco and blooms during November-December.

The vegetation of these heavy soils, either black or red and slightly calcareous, is dominated by the *Cynaraceae*. There is found especially *Echi-*

nops spinosus, *E. Bovei*, *E. strigosus*, *Aractylis gummiifera*, numerous *Onopordon*, *Carduus* and *Cirsium*, as well as *Cynara Cardunculus*, *C. humilis*, and the curious acaulous *Cynara Tournefortii*. There are few shrubs, these being generally *Anagyris foetida* and *Zizyphus lotus*. Also some bulbous plants, such as *Iris tingitana* var. *Fontanesii* with deep violet flowers, or occasionally the typical *Iris tingitana*; also *Arisarum sinorrhinum*, *Biarum Bovei*, *Colchicum lusitanum* with very large flowers, *Scilla peruviana*, the magnificent *Orchis papilionacea* var. *major*, etc.

We mention finally *Salvia bicolor*, *Teucrium spinosum* and *T. resupinatum*, *Echium pomponium* reaching a height of 2½ meters, and *Silene volubilitana* as characteristic species of this formation.

The *Narcissus elegans* is generally in dense colonies but mixed with *Tapeinanthus humilis*, a small amaryllid with fragrant yellow flowers (the odor like that of violet). The bulbs of these two plants have almost the same size and shape. They can be collected at the beginning of summer before the clay soil takes on its annual desiccation. This is manifested by the appearance of deep cracks. It requires great ability to separate the two kinds of bulbs and it is preferable perhaps to do this by growing them later; the *Tapeinanthus* blossoms in September.

Narcissus Watieri Maire

This charming calcifugous species, which is cultivated to a certain extent, was discovered in 1921 by M. Watier, Captain of Streams and Forests. It is extremely rare and strictly limited to the central Haut-Atlas on northern slopes between 1,800 and 2,600 meters. It grows in the dry oak association among oak leaf humus, but it can be

found also along the streams of plateaus which have long since been deforested. It blooms after the snow disappears and consequently at variable and uncertain times. In dry and hot years one will find only fruits in April. On the contrary, the flowering might not begin before the end of May and it can continue until July.

The *Narcissus Watieri* is protected throughout all the forests, the collecting being entirely prohibited since 1937. There are only a few rare stations in the meadow zones which are accessible to eventual collectors, but the commerce is already depending entirely upon cultivation for material. Before 1937 the collecting was done in August, the bulbs being found among the stones and leaf mold under the oaks, but, due to the prohibition mentioned, one should now depend upon cultivation of the plant, preferably in altitudes of 2,200 meters.

Narcissus Watieri is closely associated with oak groves. Otherwise, it has very few associates because the shade excludes a great number of plants. We can mention nevertheless *Mentha Gattefossei*, the remarkable *Genista florida* var. *maroccana*, *Arabis conringioides* and *Arabis Josiae*, both being ornamental endemics.

Narcissus Marvieri Jahand. & Maire

This is either a minor subspecies or a variety of *Narcissus rupicolum* of Spain; the deep yellow flowers are very graceful and with a form similar to those of *Narcissus Watieri*. They appear from April to May. The plant was discovered in 1924 by our colleague, the late M. Emile Jahandiez. It is less calcifugous than *Narcissus Watieri* and perhaps to be considered indifferent in this respect. The *Narcissus Marvieri* grows also in the oak association, but in the mountains which form the junction between Moyen-Atlas and Haut-

Atlas in the western part of Chaouia, on the north and west slopes at altitudes between 1,600 and 2,200 meters.

This also is a species protected by law in the forests, although one can, by paying a high tax, obtain an authorization to collect a few hundred bulbs per year. The collection is made in August, but the plant does not occur in dense colonies and the collector is forced to dig the bulbs after the flowering period. This difficulty together with the tax explains the rarity of this narcissus in collections, which is unfortunate because of its great ornamental attraction.

The *Narcissus Marvieri* grows in a soil formed by oak leaf humus but in forests considerably more humid than those of *Narcissus Watieri*, that is to say, in higher altitudes. In lower places it can become practically xerophytic, occurring in forests of *Laurus nobilis*. In the oak associations forests it is often sheltered by *Quercus faginea*, *Cotoneaster nummularia* var. *arborescens*, *Acer monspessulanum*, *Viburnum Tinus*, *Ilex Aquifolium* or *Buxus balearica*. It is accompanied by *Paeonia coriacea*, *Linaria Gattefossei* with large whitish flowers, *Nepeta granatensis*, *Erysimum Wilczekianum* (an excellent border plant of golden yellow flowers), *Ononis cenisia*, *Cerastium gibraltarium* var. *Boissiere*, *Arenaria armerina*, *Arabis Josiae*, *Iberis pseudotaurica*, *Genista pseudopilosa*, *Medicago suffruticosa*, and *Vicia onobrychioides*. The monocotyledons are extremely rare, there being only *Irisscrotina*, *Scilla hispanica* var. *algeriensis*, *Colchicum autumnalis*, *Epipactis latifolia*, *Cephalanthera rubra*, and sometimes *Platanthera algeriensis*.

Narcissus viridiflorus Schousboe

This is a very curious species with dark green flowers, sometimes greenish yellow. The plant does not have leaves,

the chlorophyllic function being carried on by the flowers.

It is endemic in the south of Spain and the western coast of Morocco in the humid parts of the *Chamaerops* association in slightly calcareous soils at altitudes of 10 to 200 meters.

The flowering season occurs during October. The species is but little cultivated, even though it is truly a botanical curiosity and inasmuch as it withstands a great deal of heat.

Narcissus Broussonetii Lagasca

This is a large narcissus without a corona (subgenus *Aurelia*), with totally white flowers, endemic to central Morocco, at about the altitude of Casa Blanca. We have great hopes for the cultivation in Europe of this plant with such beautiful flowers, but it flowers quite early, September to November, and requires plenty of heat. For this reason the plant flowers very seldom in Europe.

The *Narcissus Broussonetii* is seen among the calcareous rocks exposed to the humid winds of the ocean. The large bulbs, more or less rounded, appear on top of the rocks and sometimes fastened only by the roots. A great number of the bulbs growing crowded together form a splendid floral cluster.

It is especially abundant in the southwest where it extends to the ocean from the Anti-Atlas. It is then a dominant plant of the meridional flora and particularly of Morocco. We can name also the bulbous plants which accompany it: *Scilla iridifolia*, *Hannonia Hesperidum*, *Vagararia Gattefossei*, *Pancratium brachysiphon*, all endemics.

But toward Casa Blanca, *Narcissus Broussonetii* is found with *Narcissus serotinus*, *N. viridiflorus* and those of the Tazetta group.

Narcissus obliquus Guss.

This plant, equally well known by the name of *Narcissus Gussonei* Rouy, is in reality an Algerian species. It has a large corona of orange yellow upon a white background. Imported by the native Moroccans for their gardens, it has become naturalized in the olive orchards of Souss and the Mesfoua country (near Marrakesh).

The collecting can be done without difficulty in summer, the flowering taking place from March to May, depending upon temperature.

It is a beautiful robust plant and merits cultivation in Europe; it appears indifferent to calcium.

Narcissus Tazetta (L.f.) *sensu lat.*

The entirely white-flowered Tazetta narcissi of Morocco are very polymorphic. With reference to the original descriptions, one can say that the subspecies *Narcissus polyanthus* (Lois.) Baker and *N. papyraceus* (Ker.-Gawl.) Baker are co-existent in the plains of the central and western part of the country. The *polyanthus* is early, flowering from December to January, followed by the intermediary forms, which are doubtless hybrids, in January and March, and then *papyraceus* in March and April.

On the Atlantic coast where *Narcissus Broussonetii* blooms from September to November, the hybrid *Broussonetii* x *polyanthus* flowers from November to January, and then the very rare hybrids *Broussonetii* x *papyraceus* from January to March. There exist all intermediary forms between the three species, and they are encountered everywhere in acid or alkaline soils of heavy or light texture.

JEAN GATTEFOSSÉ

Translated from the French by W. Andrew Archer.

A Book or Two

How to Landscape Your Grounds, by Loyal R. Johnson. A. T. DeLa Mare Company, Inc., New York, 1941. 221 pages. \$2.75.

This book is written to aid the layman in developing his home property. It does well in giving fine lists of plant material for various localities and growing conditions, (even though it lists *Magnolia grandiflora* as a small tree!) There are excellent detailed drawings for building walls, walks, arbors and other garden structures, and some splendid suggestions for grading the grounds and locating the house.

The illustrations on the whole are good.

The plans in the rear of the book showing layouts for various sized plots in diverse sections of the country are, for the most part, clearly drawn. But, here is where the book is weak. Plans at their best are made for a special location they seldom if ever fit another. In short, it is almost impossible in a book to tell adequately how to landscape the home grounds.

G. P. C.

Gardening with the Experts, by twelve noted authorities. The Macmillan Company, New York, 1941. 239 pages. \$2.50.

To glance at the jacket with its list of distinguished authors is to be surely intrigued. The reader is well rewarded inside for our experts give us of their best. Beginning with Richardson Wright's "The Heritage of Gardens," we find our interest continually stimulated by each new chapter. Henry E. Downer condenses much of his wide knowledge of annuals and perennials into a few pages. Robert S. Lemmon

leads us enthusiastically into wild gardening.

"Plants in Your Parlor," "Understanding Color," "The Order of Bloom of Trees and Shrubs," are some of the other varied topics which lead to the last one on the running of amateur flower shows, judging, and flower arrangements by Sarah V. Coombs.

The other expert gardeners include Rosetta E. Clarkson, J. Horace McFarland, Montague Free, Dorothy Biddle, Dorothea Blom, Cynthia Westcott, Howard B. Sprague, and Donald Wyman. Biographical sketches of each author give briefly pertinent facts in their lives and list their other writings.

Because there is such a wealth of information in this book and because its variety is so refreshing, it is an addition to any garden library and an excellent gift book for gardening friends.

C. B. M.

Bible Plants for American Gardens. Eleanor A. King. The Macmillan Company, New York, 1941. 203 pages, illustrated. \$2.00.

In the opinion of the reviewer this little book more than adequately fills the long felt need for a modern book on Bible plants interestingly written and accurately compiled, as far as a lay botanist can discern. It is neither wholly a gardening book, a treatise on Bible history nor botanical work but a combination of all three. Although I may be prejudiced on the subject because of personal interest, I do not believe it is a book to be read once and then thrust aside. Its usefulness would be increased by the addition of an adequate bibliography.

Mention of a few of the chapter headings will give some idea of the scope of the work, such as, "The Fig, The Olive and The Vine," "Trees of the Lord," "Flowers of the Field," and "A Garden of Herbs." Adequate quotations are made from the Bible to illustrate the subject matter, coupled with interesting discussions of the religious, social and economic background of many of the plants mentioned. This book should serve to clear away certain popular misconceptions about some plants of the Bible, as well as be an aid in the landscaping of church grounds so as to provide where possible for the inclusion of Bible plants and trees. Also it serves to clarify various sections and quotations of the Bible by filling in the technical background, familiar to persons at the time written or spoken but not so familiar today. One finds many old friends mentioned such as *Sterbergia lutea*, *Crocus sativus*, Cedar of Lebanon and the like.

The author assisted in the preparation of the exhibit of Bible plants by the New York Botanical Garden at the Spring Flower Show in 1941 and has lectured before numerous clubs and societies on this subject. Proper credit has been given to the staff of the New York Botanical Garden, and particularly Dr. H. N. Moldenke, for assistance in connection with the book.

Last of all, mention should be made of the excellent suggestions for church fairs, etc., featuring Bible plants and products, as well as suggestions for inclusion of Bible plants and trees in church gardens. Also use of Bible plant materials in floral arrangements is dealt with and supplemented by two photographs of such arrangements by Mrs. Constance Spry.

R. C. M.

The Gardener's Third Year. Alfred Bates. Longmans, Green and Co., New York, 1941. 310 pages, illustrated. \$2.50.

This is the third volume of a series with smaller titles which was initiated in 1936. We express the hope that it is not the last and that in due time the author will pass on to different specialized phases of gardening.

Each of the books in this series presents diverse phases of the fundamentals of soil preparation, garden design, planting and maintenance in a unique and detailed manner which makes them valuable for the beginner. Garden making is presented in the most logical form for the amateur: as an unhurried process of working according to a definite plan, with the various parts accomplished piecemeal over a number of years. The first book was devoted largely to annual flowering plants and the second to perennial plants and bulbs. The present work is concerned primarily with shrubs, vines and small flowering trees. The extensive descriptive plant lists in the latter part of the book are supplemented in many cases by line drawings by the author. The pronunciation of all botanical names is indicated phonetically. The notes on hardiness, size, habit and cultural needs are particularly useful since they are obviously no mere compilation, but are based on the personal experience and observation of the author. The more advanced gardeners will obtain many choice nuggets of information which are difficult to find in other places. The list of plants discussed is in no sense exhaustive, but the selection appears to be reasonably judicious. A generous number of much neglected, but highly desirable, plant subjects are described. If the use of some of these be popu-

larized, this book will have fulfilled a worthy mission.

The style of the author is informal and even conversational but definitely readable. His well developed and definite convictions on all sorts of gardening matters are stimulating. This writing has the smell of the earth and is the personal testament of a genuine gardener.

V. S.

The Gardener's Handbook. L. H. Bailey. The Macmillan Company. New York, 1941. Revised. 292 pages, illustrated. \$1.49.

The reissue of a worthy book on gardening at a popular price is always good news, especially when the work is from the pen of an outstanding authority on horticulture. Reference to the edition of 1934 discloses that the same plates were used for this printing.

This work is arranged alphabetically and might possibly be described as a reduced, one volume edition of the famous *Cyclopedia of Horticulture* with a distinct practical orientation. A generous amount of sound, readable advice is presented in a relatively limited space.

V. S.

Collecting and Handling Seeds of Wild Plants. N. T. Mirov and Charles J. Kraebel. Civilian Conservation Corps Forestry Publication No. 5. Supt. of Documents, Washington, D. C. 42 pages, illustrated. Price 10 cents.

Many gardeners, particularly those of the more advanced section of the fraternity are interested in the propagation of wild native plants. The present bulletin is particularly helpful to those dealing with plants native to the western part of the U. S. A., but those interested in plants of other regions will find suggestions on both seeding and vegetative propagation.

V. S.

Tropical Fruits for Southern Florida and Cuba and Their Uses. David Sturrock. 131 pages. The Arnold Arboretum. Jamaica Plain, Mass. 1940. \$1.25.

This paper bound brochure of 131 pages could easily have been illustrated and presented as a conventional cloth bound book. A long list of fruits, many of them entirely unknown to the average dweller in a temperate climate, is discussed from the standpoint of both culture and culinary or other uses. Some of these fruits are just beginning to appear occasionally on the markets of northern cities.

This work will be useful not only to those living in the regions described, but also to the increasingly large group interested in the resources, actual and potential, of the tropical Americas.

V. S.

Daylilies: 1941 Introductions. Color Patterns. A. B. Stout. New York Botanical Garden. 12 pages, illustrated. 10 cents.

This bulletin is a reprint of two articles originally published in the journal of the New York Botanical Garden. Twenty daylily introductions are described in a manner which will doubtless be helpful to nurserymen who eventually will list these varieties in their catalogues. Colors are described by reference to standard color charts. Careful varietal descriptions of this sort doubtless should be recorded in horticultural literature in journals commonly preserved in libraries, as material for students of progress in plant breeding.

The present wholesale introduction of daylily varieties creates much the same problem for the daylily collector and fancier as that experienced by philatelists specializing in certain issues of postage stamps. Undoubtedly the

varieties described here will attract more than average attention since the author is one of the most conservative breeders in the matter of introductions.

The second part of the bulletin discusses the color patterns which have appeared in seedlings up to the present time. The entire bulletin is well illustrated.

V. S.

The Garden of Larkspurs. L. H. Bailey. The Macmillan Company, New York, 1941. 116 pages, illustrated. \$1.39.

This is a reissue of an excellent book which was published at 1939 at a much higher price. The illustrations are good and add to the attractiveness of the book.

R. C. M.

The Garden of Pinks. L. H. Bailey. The Macmillan Company, New York, 1941. 142 pages, illustrated. \$1.39.

This is a reissue of another Dr. Bailey's excellent treatises devoted to a single plant family. There is much of historical, botanical and garden interest to all who are enthralled by this interesting family and the drawings convey the spirit of the subject matter. Those who failed to purchase the first edition can now purchase it at a lower cost.

R. C. M.

An Herbal (1925). Edited by Sanford V. Larkey, M.D., and Thomas Pyles. The New York Botanical Garden, New York, 1941. 200 pages. \$3.50.

The first herbal ever printed in the English language—the famous herbal of Richard Banckes, published in London in 1525—is again being made avail-

able, four centuries after its first appearance. A reprint of this rare work, of which only two copies are in existence today, is being issued by the New York Botanical Garden as a book of about 200 pages.

A complete facsimile of the copy in the British Museum is included in the modern reprint. This is preceded by an introduction and followed by a transcription of the entire text, with notes, in modern English done by Sanford Larkey, M.D., who is Librarian of the Welch Memorial Library at Johns Hopkins University and Thomas Pyles, Assistant Professor of English at the University of Maryland. The work was sponsored by the Scholars' Facsimiles and Reprints, an organization interested in the preservation of useful rare books of the past.

While the Banckes Herbal is anonymous (Richard Banckes was its first publisher), it became so popular during the sixteenth century that for thirty years new editions kept appearing under different titles and from different printing houses.

"It is certainly quite a different work from the grete Herball, printed in the succeeding year" writes Agnes Arber, British authority on herbs and their literature in one of her recent books, "and, although there are no figures, it is in some ways a better book." There is more botanical information given about the plants than was customary in the writings of this period.

Now that we have so wide spread an interest in the growing and the use of herbs in modern gardens, this volume should be a welcome addition to each collection and the perusal of its pages, both the originals and the transcribed should add to the keen pleasure of the owner.

The Gardener's Pocketbook

Spiraea Margaritae

The *Spiraea Margaritae* is a hybrid between *Spiraea japonica* and *Spiraea superba*. It looks like a large and improved *Spiraea* Anthony Waterer which is also a horticultural descendant of *japonica*. The bush grows to five feet and spreads from suckers and becomes quite broad. The movement of the shrub is perpendicular.

The stems are red-brown, the alternate leaves have short petioles and the blades a humpy surface. They are ovate, doubly dentate along the upper two-thirds of the margins and measure $3\frac{1}{2}$ " in length and $1\frac{5}{8}$ " in breadth; that is, the largest do. The conspicuous flowers grow in compound umbels at the termination of the stems. The separate corymbs in the umbel are three inches across while the compound umbel is ten inches across. The effect of the flower heads is fuzzy because the numerous stamens extend beyond the florets. Each floret has five petals and measures $\frac{1}{8}$ " across. They are "rose pink" shading to "deep rose pink." The shrub is not one of the handsomest but is attractive in late June when most of the shrubs have already finished flowering.

Micromeria rupestris

The *Micromeris* of the Labiatae are subshrubs with fragrant foliage, and little white flowers and are very like the savories. One of them, *Micromeria rupestris* is hardy as far North as Zone V, but *Micromeria croatica*, *Micromeria Piperella*, *Micromeria dalmatica* and *Micromeria Juliana*, though charming, all died their first winter in a New York garden.

The plants come readily from seeds, as do most of their relatives. *Micromeria rupestris* has partially recumbent stems. They are square and their base is woody, brown, and rough, while the upper and newer growth is a yellow green. They rise up to ten inches and form much branched, shrubby plants with dainty white flowers in terminal spikes. The leaves are obovate, rounded at the tip, $\frac{3}{8}$ " long and $\frac{1}{4}$ " across at the widest part. The under surface of the leaf is finely hairy, and shows prominent net veining with the central vein the most prominent. The margins are entire except for a few notches. The stems are covered with sparse hairs. The leaves are opposite and have pairs of smaller ones growing out of their axils. They are fragrant of pennyroyal. The flowers are tiny white, $\frac{5}{8}$ " long in opposite clusters from the leaf axils and along upper part of stem forming a spike $\frac{3}{4}$ " long. The calyx is light green, cup-shaped and ridged, with five pointed sepal lobes. The corolla is two-parted, the lower lip three-parted and the central one marked purple, the upper one is notched in the center. The pistil is white, two-parted at the tip and projects beyond the corolla; there are two pairs of stamens inside the corolla.

Penstemon diffusus

Penstemon diffusus is a western plant, native from British Columbia to Oregon. It has proven hardy in my Peekskill garden, provided it is given a thoroughly well drained situation and plenty of sun. The plants come readily from seed and although handsome are of doubtful garden value because they



Walter Beebe Wilder

Spiraea Margaritae

[See page 34]

become bushy, being three feet across and two feet high, and when their three weeks of June flowering is over, look weedy.

The stems are round, smooth and downy. The dark green, cordate lanceolate leaves are opposite, toothed irregularly and deeply, stemless and widest at the base. The largest measure $1\frac{1}{2}$ " at the base and 4" in length. They grow smaller as they ascend the stem. The flowers in loose terminal racemes, three and a half inches long, are tubular and shaped something like foxgloves. The calyx is five-parted, green, with toothed sepals, each with a fairly long spike at the tip. The corolla is tubular, blue with violet shading, two-lipped, the two segments forming the upper and three the lower lip. The flowers measure one inch in length and $\frac{1}{2}$ " across at the mouth. The ovary is level with the top of the calyx and is green and egg-shaped. The style is grey-lavender. There are five stamens—four have reddish purple anthers and white filaments, the fifth is sterile and bearded. The plants smell of meadows and green stems.

The effect of the violet blue coloring in the mass and seen from a distance is faintly reminiscent of *mertensias*, only of course the plants are very different.

Leiophyllum buxifolium prostratum

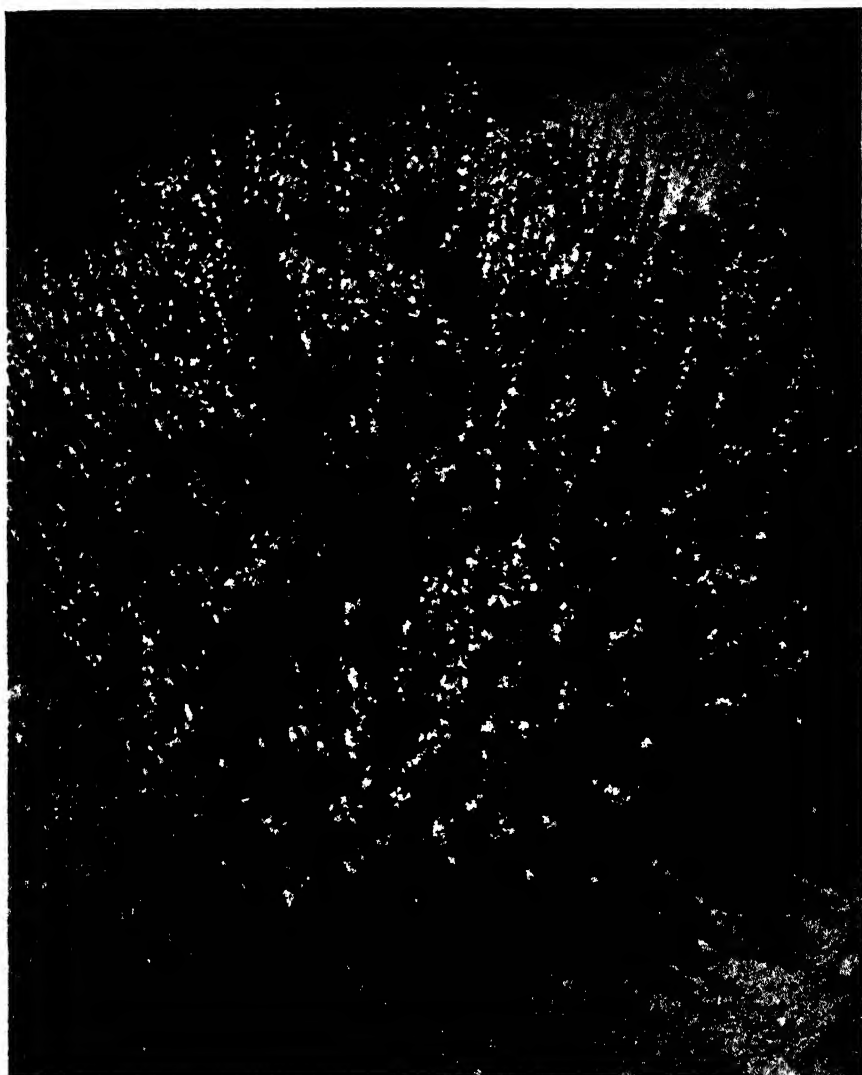
The Sand Myrtles, *Leiophyllum buxifolium* and *prostratum* are both attractive evergreen low shrubs of the Heath family. *Leiophyllum buxifolium* is native of the Pine Barrens from New Jersey to Florida and *Leiophyllum buxifolium prostratum* of the mountains of North Carolina and Tennessee. From my own garden experience I should say *buxifolium* requires sun and *prostratum* shade. They bloom the end of May.

They are both neat, small shrubs, with shiny boxlike leaves and white, rose-tinted clusters of flowers, feathery with exserted stamens. *L. prostratum* differs from *buxifolium* in having prostrate or widely spreading branches instead of being compact—and in having the leaves mostly opposite instead of alternate and in their shape "oval to elliptic oblong" to use Dr. Rehder's description which in *buxifolium* are "oblong to oblong ovate."

On *prostratum* the stems are woody and brown, and nine inches high. The plants are eighteen inches across. The shape of the leaves in English might be called oblong, and are $\frac{3}{8}$ " long, rounded at the tip, shiny and smooth. The pedicels are pubescent. The flowers in terminal corymbs are wheel-shaped and white while the buds are pink. The white filaments carry magenta anthers like little dots and are exserted way beyond the florets. There are from 12 to 21 florets to a corymb.

Lonicera praeflorens

The earliest fragrant honeysuckles to bloom have heretofore been *Lonicera fragrantissima* and the closely related *Lonicera Standishii*, both semi-evergreen shrubs with cream white flowers borne on stems bare of leaves. Their fragrance, pungent and sweet is wafted forth in the cool spring air, a portent of other pleasant perfumes to follow. This spring, after having been in the garden for three years *Lonicera praeflorens* bloomed for the first time during the second week in April, preceding the foregoing by about a week. The shrub grows wild in Korea and Manchuria and was introduced into cultivation in 1917. It has twiggy grey branches with scaling threads and when mature rises to six feet. The flowers bloom on twigs bare of leaves and their fragrance is typical of the honeysuckles. They are



Walter Beebe Wilder

Micromeria rupestris

violet-pink and enhanced by anthers which, to me, appear to be rose with a salmon tinge though Dr. Alfred Behder in his *Manual of Cultivated Trees and Shrubs* describes them as purple. Unfortunately the flowers fall off early in contradistinction to those of *fragrantissima* which last a long while. After the

flowers have dropped, from the time the young leaves begin to open and as long as they remain on the shrub, this honeysuckle is strikingly handsome. The leaves grow in pairs, are yellow-green, velvety with soft hairiness, and borne on short hairy stalks, tinted dark red magenta. They are oval, terminate in

*Silvia Saunders**Penstemon diffusus*

a sudden point at the apex and are rounded at the base. They measure $2\frac{1}{2}'' \times 1\frac{3}{4}''$, some being larger and others smaller. They are close enough on the stalks, and the stalks to each other, so that they sometimes overlap.

Perovskia abrotanoides

Perovskia abrotanoides is a fragile looking plant with semi-prostrate square stems and small bi-pinnately divided leaves, fragrant of rosemary. The tiny blue flowers are similar to those of the lavender. The whole plant is grey, covered with a soft hairiness, while the young growth looks almost white.

Perovskia is a plant for the margin of the shrubbery and also does well in a rock garden because it requires a warm and sunny situation. So far it has not set seed for me but is increased

readily from cuttings.

The semi-prostrate branches are two feet long and hairy. The leaves are $1\frac{1}{2}''$ long and $\frac{3}{4}''$ across. They are widest at the base and narrow to the tip in a slender triangle. They are hairy, exceedingly dainty and make a pretty pattern with their divisions and good proportions.

The flower spikes rise perpendicularly from the semi-prostrate stems and the flowers are far enough apart to be clearly articulated. They are $\frac{3}{8}''$ across at the mouth and the same long and grow in sparse spikes.

Usually *Perovskia atriplicifolia* is sent out by nurserymen instead of *abrotanoides*. There seems to be some confusion about the plants. *P. atriplicifolia* is a much coarser plant and not fragrant.

HELEN M. FOX



Walter Beebe Wilder

[See page 36]

Leiorhynchus prostratum

FROM THE MIDWEST HORTICULTURAL SOCIETY

Galax aphylla

Many people are familiar with the leathery, roundish glossy leaves of the galax in wreaths and other preserved decorations at holiday time. This same plant is also an excellent subject for the wild or rock garden and is effective as a ground cover throughout the year although particularly conspicuous during the colder months. One writer calls it "one of the loveliest, hardy foliage plants in existence."

Although, typically a foliage plant this lovely native also produces spikes of small white flowers in the summer.

Most authorities recommend that this plant be grown in partial shade and in an acid soil. My first contact with galax was as a stray in a clump of rhododendron and since then I have given similar soil and exposure conditions to several clumps with absolute success. Probably a porous soil rich in humus would be just as satisfactory, and certainly many spots can be located in the average garden where shade can be given. The new leaves and the old ones in autumn have bronzy tints which add to the richness of coloring. The plant grows from a creeping stem which sends out runners so that a clump is quickly built up from small divisions in congenial surroundings.

ELDRED E. GREEN

Euonymus europaea

A branch of an attractive red fruited shrub was sent me for identification this last week. The branch was clothed with rather ordinary oval green leaves. At the base of each leaf was a cluster of two or three bright red fruits. The contrast between the foliage and fruit

was striking. A few days after the branch had been in water the red fruits split to display the orange seeds much as one sees in the fruits of bittersweet.

This branch was from the European Burningbush or Spindle tree. This is one of the shrubs that can be considered for winter effects in the landscape. It is a rather large growing plant and not outstanding except when in fruit. Frequently seedlings are found around mature plants and grow rapidly into large plants. The plant responds to ordinary soil and exposure conditions.

This shrub is a relative of the bittersweet (*Celastrus scandens*) and deserves the same consideration for landscape value.

ELDRED E. GREEN

Mahonia aquifolium

In a region deficient in broad-leaved evergreens the relatively few that are easily grown should assume more prominence than in more favored localities.

One of the more iron-clad sorts is the Oregon Holly-grape. This is a slow growing round topped shrub that is usually evergreen. The leaves are composed of several pairs of spiny-toothed leaflets which greatly resemble holly. The young foliage is an attractive bronze-green and contrasts excellently with the darker green of the older leaves.

This plant is not particular as to soil or location but a sheltered spot would assist in retaining the foliage in unusual winters. As this is a slow growing plant it should preferably be planted as a specimen and a fairly large plant obtained. Cuttings root easily and plants can be obtained by this method if one has time to wait for them to develop.



Lonicera praeflorens

As a substitute for the less tractable holly this plant deserves a wider popularity in the middle west. As an ever-green attractive shrub it is invaluable in many situations in the average garden.

ELDRED E. GREEN

Paeonia officinalis

A short time ago I was astonished by one of my peony-growing friends that he had just obtained plants of *P. officinalis* after some difficulty in locating a source. I had thought this old-

fashioned red "piney" was so common that it could be found in any catalogue. Yet I could not recollect offhand more than one or two specialists that I knew definitely had this item listed.

Apparently this lack of another old time plant in nurseries and gardens is due to emphasizing the new varieties to the exclusion of the older ones. To see this peony at its best one should visit some of the old, generally neglected cemeteries around the end of May. (Decoration Day in this section.) Here large clumps of the grand old red peony

will be covered with masses of flowers which will leave a compact dark green clump of foliage after the flowers have fallen. This peony has the most attractive foliage and plant form of any of the peonies. Perhaps one of the contributing factors to the scarcity of the plant in many nurseries is the slower rate of increase. Generally five or six years are necessary for this to build up a good clump while only three years are necessary in many of the hybrids.

As a dependable early peony this species has no equals. It is an excellent garden subject and is just as easily grown as any of the later hybrids. If your local nursery does not have this probably a trip to some old farmstead would yield a division for the garden.

ELDRED E. GREEN

Lycoris squamigera.

Just finishing its flowering is the beautiful hardy amaryllis. This is catalogued as *Amaryllis Halii* or *Lycoris squamigera*, the latter being the more correct usage.

My first introduction to the plant was in Cleveland Heights on one of the estates. Here a small valley had been planted with hundreds of bulbs and on my visit most of them were in full bloom. It was a sight of beauty that has never left my memory. The peculiar pink with a slight bluish cast of the flowers on the tall plain stem unadorned by any foliage, literally covering hundreds of feet of the magnificent estate, was a sight that I have never seen equalled.

Culturally the plant is not a difficult subject. It needs a good loam soil, full sun to light shade, moderate moisture, and fairly deep planting, six to eight inches being about right for a medium bulb.

This is one of the bulbs that flowers and grows at different seasons. In the Spring several long bright green, strap-shape leaves grow from the ground. In early Summer the leaves disappear and after a few weeks the flower scape shoots from the ground. It is generally necessary to mark the position of the bulbs in the summer so that the flower scapes will not be destroyed by routine cultivating operations in the garden before they are above ground.

The resemblance in flower size and shape to the common greenhouse amaryllis is quite marked. The technical differences that place this in *Lycoris* are matters for the botanist, to the gardener this is the hardy amaryllis.

ELDRED E. GREEN

Iris sisyrinchium L. [See page 45]

For the amateur in the Eastern States this species, unique among all its fellows in the genus, presents cultural problems that are almost too difficult to warrant the labor involved. If one looks through the countries represented by herbarium material examined in his studies—Portugal, Spain, Morocco, Algeria, Tripoli, Tunis, Majorca, Corsica, Sardinia, Italy, Sicily, Malta, Crete, Greece, Asia Minor, Cypress, Egypt, Syria, Mesopotamia, Arabia, Persia, Turkistan, Bokhara, Baluchistan, Afghanistan, Northwest Frontier Province (India)—the explanation of our difficulties is easy enough, especially if one recalls the differences in season of rainfall and incidental cold. The wide distribution is also reflected in the great diversity of plant forms that show among the specimens cultivated here.

The first specimens grown came from a California nursery and under our conditions proved hardy only for two



Walter Beebe Wilder

Perovskia abrotanoides

[See page 38]

years. They flowered the first season with one or two leaves and flowers produced on very short stalks, so that the effect was negligible. The flowering stalks shown in the illustration were grown in another garden from roots obtained in Turkey. Having been grown in a cold pit, it was possible for the plant to develop slowly during the winter which doubtless aided the normal development of the flower stalk.

As is doubtless known from books, this species is unique among iris species

since it has a cormous root, with a netted coat that suggests its possible kinship to the Reticulata Section. Mr. Dykes pointed out (Genus Iris, p. 232-233) that Sir Michael Foster considered it "an approach to the archetype of the genus" and reports for himself that "In its corm and in its single-valved spathes it is more like a *Moraea* than an *Iris* but since its segments coalesce to form a tube for a short distance above the ovary, it is considered an *Iris*."

Provided it were compatible, how splendid it might be to cross this plant with some of the showier species. Even with the relatively less showy *P. incarnata* Linn., whose range of hardiness disappears somewhere in Virginia but far south of here. This latter species was not understood clearly when first introduced into Britain and does not figure among the species that occur in these early series. It was not until 1839 that it was given a plate (t.3697) in Curtis' Botanical Magazine accompanied by a text that is concerned with differentiating it from *P. edulis* Sims, a purely tropical species which has a large literature related to its fruiting.

No special peans can be sung in praise of its small fruits which are scarcely the size of a cranberry and ripen most irregularly.

Daphne Genkwa Sieb. & Zucc. [See page 47]

Among the many fine plants that have been in and out of cultivation many times and still remain somewhat difficult to find quickly when one wants to make a purchase, is this deciduous daphne. Unlike *Daphne cneorum* which has been the subject of many cultural notes largely given over to differences of opinion as to the plants like or dislike of lime, this oriental daphne has very little notice.

Its original description found in *Flora Japonica* v. I, p. 137, by Siebold and Zuccarini may be translated roughly:

"Shrub 2-3 ft. high, with spreading and divergent branches, deciduous. Flowers with the coming of the foliage in March or April. The flowers of lilac color are placed in small bouquets (literally clusters) of two to six. It is originally from China but now it is cultivated in the gardens of Japan for

ornament rather than to serve the pharmacists. The flowers and the bark are considered the medicinal parts."

The paragraph on its uses shows almost as numerous and diversified potencies as we might expect of a modern nostrum.

Siebold gives the Japanese names as: "Fudsi modoki and Sigenzi and the Japanese version of the Chinese name as Genk'wa," which is taken over in the scientific name.

According to report, the plant is easily raised from seed as are most daphnes, provided one can get the seed! Young plants grafted on *D. mezereum* have not been long lived under our garden conditions and the one plant on its own roots has not grown as it should. This undoubtedly is because the situation is far too dry and the soil too full of competing roots.

Good plants in a Pennsylvania garden were given a location in rich alluvial soil where there was a good water table relatively high. Here the bushes made a more than vigorous growth up to three feet and almost as much through. While the shoots and laterals are thin, the plant does not give a meager impression. In the spring, however, before the leaves count much, the delicate lilac flowers make a smoke-like color mass through the twigs as can be guessed from the illustration. The fragrance is not so pervasive as that of *D. odora* (often wrongly called *D. indicum*).

According to Bean, "Trees and Shrubs Hardy in the British Isles" (Ed. 1925, v. I, p. 469-470) this species was "Introduced from China by Fortune in 1843, and later from Japan, where it has long been cultivated but is not native. Unfortunately it is too tender for all but the mildest parts and is short-lived in cultivation.*** It is said to require a soil devoid of chalky

*Claude Hope**Daphne*

[See page 46]

substances, but its treatment is little understood."

If it were not well known that many shrubs, entirely hardy here, fail to ripen new growth in Britain and so suffer in the winter season, this note from Mr.

Bean might be puzzling. And one wonders if his last sentence will not promote another controversy over soil reaction. All plants known here have been in slightly acid soil.

Good plants of this are hard to find,

but there seems to have been a concerted effort in recent times to keep a supply available, an effort that gardeners should not overlook.

Amaryllis belladonna L.

This plant, cultivated with some frequency in Chilean gardens and generally in the entire world, has become spontaneous in numerous localities in the Province of Valparaiso.

It has been seen growing in these conditions at Olonne in El Granizo started at the foot of the Cerro de la Campana; between the station Rauten and Mauco along the R. R. of San Pedro to Quintero and in Concon.

They are often frequent enough and usually may be seen in extensive patches very conspicuous at the time of their flowering on account of their large trumpet-shaped flowers of pale rose color, which grow freely on their spikes, before the leaves which appear separately a considerable time after the flowering.

As may be proved many times, *Amaryllis*, when growing alone, usually indicates deserted human habitations, but the bulbs multiply easily and, without doubt, the late spring (early summer) rains frequently disinter the bulbs which are carried some distance, which explains the presence of these plants in sites where there are no vestiges of human habitation or old gardens.

It has been proved that the *Amaryllis* produces seeds in Chile. I have, for example, seeds of plants cultivated in Limache, which I owe to the kindness of my friend and coworker, Don Augustin Garaventa; but I am not in position to determine if they are fertile or not. The practical method of increase in gardens is by means of bulbs.

In the area of my observations, the *amaryllis* begins to grow (show shoots)

about the middle of February or the beginning of March. Usually after the leaves have entirely disappeared, the scape appears suddenly and in a week or less reaches a height of 50-80 inches and opens some 6-10 large flowers which remain fresh a couple of weeks and exhale an odor sweet and agreeable. The plant is poisonous.

The common name of this plan in Chile is *nardo* which is also applied to the genera *Vallota*, to *Hippeastrum* and to certain *Lilium* with large white flowers.

The genus *Amaryllis* Linn., Syst. Ed. I. 1735; Sp. Pl. 292, 1753, is considered monotypic in fact. Its one species, *A belladonna* Linn. Sp. Pl. 293, 1753, originates in South Africa. It was introduced to Europe in 1712 and exists in numerous horticultural forms. Previously, many species which today are placed in the genera, *Lycoris*, *Nerine*, *Brunsvigia*, etc., and especially *Hippeastrum*, were placed in the genus *Amaryllis*. On account of this, gardeners commonly call *Amaryllis* many plants which are no longer such botanically speaking, particularly *Hippeastrum*. It is easy to distinguish this last genus from true *Amaryllis*, since this has a solid scape, while that of *Hippeastrum* is hollow.

In Greek *Amaryllis* means to shine, and is the name of a nymph whose beauty was sung by Virgil.
Santiago, 17 June 1939.

Gaulterio Looser

Revista Chilena de Historia Natural.
Direccion Postal: Casilla 2974, Santiago de Chile.

Translated from the Spanish by B. Y. Morrison, 1-17-41.

Narcissus Silver Chimes

Since the Paper-white *Narcissus*, being tender, is of no further use to us after being forced, and other *Narcissi* can only go into the garden for recuperation, it is pleasant to know of one that will live along comfortably year after year in a pot.

N. *Silver Chimes* is a triandrus and Tazetta hybrid, and, to quote Mr. Bowles, is a "plant of outstanding refinement and charm—It has all the beauty and rich effect of the best Tazettas, combined with a refinement of texture and colouring not found in any of them." And again—"Silver Chimes . . . is the most exquisitely refined of all polyanthus forms, both in delicacy of colouring and the charm of its poise and proportions."

It is a cross between Grand Monarque, a large flowered Tazetta with white perianth and citron cup, and triandrus calathinus, which has fine-textured drooping white flowers with reflexing perianths. It is classed as a triandrus hybrid, 5b. The plant has the vigorous growth of the Tazettas, but the flowers have the exquisite texture and crystalline whiteness of triandrus.

It was introduced by E. and J. C. Martin of Cornwall in 1916, and received the R.H.S. Award of Merit for cutting in 1922. There is a drawing of it by E. A. Bowles in his *Handbook of Narcissus*, Plate xiv.

The heavy, rather dark green foliage makes a splendid foil for the graceful clusters of delicate white flowers. The leaves are about three-fourths of an inch wide, and eighteen inches tall. The wide-petalled perianths are about two inches across and glistening white. The cups are about half-an-inch wide and long, of palest primrose on opening, but soon fading to match the perianth, so that the effect of the flower cluster

is pure white. There are from five to eight flowers in a cluster.

We have made an effort to grow *Silver Chimes* as naturally as possible, not forcing it at all. It began to bloom February 4 in 1940, and January 30 this year. The flowers last longer if kept out of the hot sun. After they have faded, the plants should receive the same good care until the foliage withers. Then the bulbs are allowed to remain in the pot, which is either set out-of-doors for the summer, or watered two or three times, as if rain had fallen, to approximate natural conditions as far as possible. The bulbs are repotted in late summer.

The original one large bulb bore two stalks of flowers the first year, and five the second year. It may continue at that rate indefinitely if it likes, for we can never have too much of such a lovely flower. RACHAEL CAUGHEY

Ferraria undulata L. [See page 51]

According to the literature, the subject of this note has long been known to cultivation but is rarely met with. Certainly, insofar as our own country is concerned, it is not often seen and our own experience showed only that it was one of the amazing flowers figured in that book full of almost unbelievable flowers, Mrs. Loudon's "The Ladies' Flower Garden of ornamental bulbous plants," a work which rather tends to flatter many of its subjects.

The roots look somewhat like rhizomes, somewhat like corms and, as planted here, were given a warm, well-drained soil mixture, potted and kept in a slightly heated pit greenhouse. The developing growths suggest almost a dwarf bearded iris, until the flowering shoots develop. These have smaller leaves that almost clothe the entire stems, the flowers emerging from the upper leaf axils.

The size and general character of the flowers is clearly shown in the illustration, which is natural size. Whether our cultivation was at fault or Mrs. Loudon's artist was given to exaggeration, we do not know but these flowers are smaller than hers as shown, although they are of the same size as the somewhat sketchy illustration in Colonel Grey's "Hardy Bulbs" (v. 1, p. 81.)

The flower color is curious. Colonel Grey (l. c. p. 80) reports the color as "greenish-brown or plum coloured, purple blotched." This is essentially correct and yet it does not altogether suggest the plant. Left to our own devices we probably should have said olive green, not far removed from the color of the pickled green olive but immeasurably richer since the actual texture of the perianth segment is velvety. The Ridgway color notation made this year is Light Yellowish Olive to Yellowish Olive with blotches of Dark Dull Violet Blue in creamy white zone.

The stalk which was examined and later pressed for the herbarium had three lateral branches and a total of ten flowers. The flowers usually last only one day but in gray weather a little longer, withering spirally and neatly and persisting for a short time.

As is often pointed out, the plant is not far removed from *Tigridia* and requires about the same type of cultivation. As its dormant root is much smaller, however, it probably will require a little more care in its winter storage, when grown in cold areas. As it comes from South Africa, it probably will be more useful for the warmer areas in the Southwest than elsewhere, but in that land its rather retiring beauty may be overlooked. When the plant is grown entirely outside its range of hardiness, it should be allowed to die down naturally, kept dry in the pot or

flat and not removed until late summer, when it should be lifted, cleaned and replanted in fresh soil. By September growth will have appeared that continues slowly through the winter until flowering in late February or early March.

There seems to be a difference of opinion over the scent. The writer has no special recollection—the other observer insists upon a piquant scent that is pleasant at a distance but oppressive near by; Ferrari, who described it at some length in 1638, does not mention it, if I may trust my ancient Latin.

This Ioannis Baptista Ferrari published in Rome in 1633 a most interesting book with excellent engravings of which No. 171 is our plant, which carries the pre-Linnean name of "*Flos indicus c violacea fuscus radice tuberosa*." The description of the plant is almost as good as the plate and one wonders how the plant came to his hands.

Th author of the notes to accompany the plate in Curtis Botanical Magazine (t.144) [1791] quotes Mr. Miller who "informs us that he received the roots of this plant from Dr. Job Baster, F.R.S., of Zirkzee, who obtained it from the Cape, of which it is a native."

The same author states that it is "usually propagated by offsets, which its bulbs produce in tolerable plenty." *** This agrees with experience here, since the most careful pollination of the flowers yielded few seeds in fewer pods.

Mrs. Loudon, already mentioned, quotes an apparently later edition or work of Ferrari which he claims was published in Amsterdam in 1646. Ferrarius, *** calls it a curious and rare flower, lately brought from India, almost all countries being at that time called India that were beyond the boundaries of Europe. It does not appear to have been introduced into England till 1755. This species is a favourite



Claude Hope

Ferraria undulata

[See page 49]

flower in Italy, and few persons have ever received a packet of roots from Italy without its being among the number."*** (pp. 24-25.)

Who may first have brought it to the United States may never be known.

CORRECTION :

On page 291 of the October, 1941, issue of THE NATIONAL HORTICULTURAL MAGAZINE, there appeared an article from Mrs. Coombs, "Three Interesting Foreigners," which we regret to say we should not have printed! It is not that we regret the article! Only that we must now confess that we should not have had it in the file of available material since Mrs. Coombs had sent it elsewhere and Mrs. Hansell had used the material in *The Gardener's Chronicle* for June, 1936.

We have already apologized to Mrs. Coombs and to Mrs. Hansell and now wish to bring it to the attention of our readers.

Kalmias

Small shrubs for the rock garden are always appreciated and some of the taller ones may also be used successfully by keeping them well pruned. The result is better plants because they are more compact and florescent by having this treatment. *Kalmias* belong to this group.

The common *Kalmia latifolia* may be used for years as a background in large gardens by this method. The smaller kalmias are excellent in many places if properly cared for. *Kalmia angustifolia* is colorful when in bloom with its many pink to rosy-purple flowers, and the foliage is attractive at all times as the glaucous blue is a contrast for most other plants. The white form of this shrub is extremely handsome. The corolla is a pure white but has the

characteristic deep maroon dots which make it so very striking. *K. carolina*, to the layman, is the same. The botanist, however, will find a few more "hairs" on the plant, especially on the new growth. All of the small leaved plants in this section seem to be of the species *K. carolina*. For me the little *K. hirsuta* has been very difficult to grow. It seldom gets more than twelve inches high and the miniature deep red flowers are most intriguing. The stems and leaves are so hairy they fairly bristle. The treatment for this should be the same as for the above as they are found growing under the same conditions.

K. cuneata is very rare and is the only deciduous one we have. It is a small shrub, seldom more than two feet tall. It bears white flowers, slightly larger than those of *K. angustifolia*, with pale red dots on the corolla. The flowers are in dense whorls around the stem. The foliage, which is rusty green in summer, turns a dark reddish color in fall before it drops, and is lovely in the landscape scene. This plant can be identified when not in flower or without foliage, if in fruit, as the capsules turn up at the tip of the petioles. It is certainly worth a place in many gardens.

ANNIE LEE R. CLEMENT
Asheville, N. C.

Tiarellas

All gardeners who have shady places are familiar with the common *Tiarella cordifolia*, Foam Flower, of the woodlands. It is excellent as the foliage is attractive all summer and the spikes of white feathery flowers are lovely in spring. This plant spreads by runners which take root at the leaf nodes. Large colonies are soon established. Another tiarella of this type is *T. macrophylla*,

which is a more robust plant. There are also other distinguishing marks for the advanced student.

However, it is the tiarellas that do not have runners I want to discuss. *T. Wherryi* is a compact plant which has flower spikes about eight inches high. The buds are a decided pink but are white fully open. This rather new species is very floescent and continues blooming over a period of several weeks. It is quite distinct from all others and by far a much better plant. It may be propagated by seeds or divisions and likes the same conditions as the other species. Another *tiarella* which has been given only a varietal name (but which I think is entitled to the rank of a new species) is *T. cordifolia* var. *piedmontensis*. This is a very sturdy plant with flowering spikes twelve inches. The flowers are pure white and it is the heaviest bloomer of all. I have had many plants carry fully twenty flowering spikes at one time. It has no runners and is a shapely plant at all times. These two compact tiarellas are certainly an advantage in a small garden as they stay "put" and do not spread all over everything, choking out many choice plants that need plenty of air and light.

ANNIE LEE R. CLEMENT
Asheville, N. C.

Aconitums

In spite of their ill-repute, these tall and handsome plants of the Buttercup family, appear to have become increasingly popular during the past few years. This is no doubt due to the introduction of new species; followed by the skill of the hybridist.

The popular name monkshood owes its origin to the hooded form of the flowers, whilst wolfsbane carries its own significance, for the *Aconitum* is

as dangerous to animals as to man, and this should be borne in mind if stock is grazed near the garden. It is poisonous in all its parts, but there would probably be no injury to its discredit but for the fact that the roots bear a certain, though distant resemblance to horse-radish, and has been used instead of that pungent root by ignorant and careless people with disastrous results.

Because of this it is advisable to keep the plants well away from the kitchen garden, and in any case a site in the Shrubbery, or Wild Garden is much more suitable.

If planted in a moist and partially shaded spot, not only do they make more luxurious growth, but the color of the flowers are more intense. For the best results have the site deeply dug, incorporating a liberal supply of well-rooted manure.

The common monkshood *A. Napellus* is a British native, which favors shady places near water; it grows about 4 feet high, and bears its deep blue, hooded flowers in early summer. There is also a white form but this is of little garden value.

Of the modern species, *A. Wilsoni* is outstanding. Attaining a height of between five and six feet it produces loose branching spikes of lilac-blue flowers from August to October, whilst *A. Wilsoni* Barkers variety is a very beautiful variety of recent introduction, having bold pyramidal spikes smothered with large violet-blue flowers in September and October. It has been honored with an award of merit by the Royal Horticultural Society.

The Japanese species *A. autumnale* is the deepest colored monkshood that I am acquainted with, having crowded panicles of rich dark-blue flowers during September and October, and growing to a height of 5 feet.

Of comparative dwarf stature is *A.*

paniculatum, as it only reaches a height of 3 feet. It is conspicuous by its attractive, deeply cut, dark green foliage, and stout spikes terminating in branched panicles of violet-blue flowers during July and August.

Of the so-called yellow flowered aconitums, it cannot be said that they have much garden value, excepting perhaps *A. Lycoctonum pyrenaicum* which hails from the Pyrenees, and has slender branching stems with much-cut leaves, bearing a profusion of clear-yellow flowers in August.

Finally there is the climbing monkshood which was introduced by the late George Forrest under the name of *A. volubile*. It is an excellent climber, with a profusion of dark-blue flowers in late summer, and is indeed a very lovely plant.

H. JEFFREY

*Dartington Lodge,
Totnes, Devon, England*

Vegetable Gardening, 1942

In the weeks just passed there has been much in the public print in regard to vegetable gardening and other horticultural activities among amateurs. The problem before us at the moment is not only a definite understanding of the term amateur, but an understanding of what is actually wanted from us all.

The essential thing is to maintain a level head. We know that we are passing through a period in which we must alter our ways of living in order to

meet successfully the winning of the war. We know that we have to make many decisions in regard to practices which are old and familiar and often well-beloved. What we need to know are the ultimate measures of the essential in the opinion of our leaders. Until these are more fully stated, we must go ahead with care.

It seems too obvious to need restating that if increased food production is the essential matter, this must not be left to scattered efforts of persons who have no special training and no experience on which to base their present labor. We know that each year, even in those in which no emergency exists, there are gardens planted and seeds wasted. This year when we must depend upon seed supplies which already exist within the country, we must ask ourselves with brutal candor, can I be depended upon to produce a valuable harvest from the seeds which I may purchase? Is my garden a suitable place to produce vegetables or should I find a place in the community where I can work in proper environment? Can I be depended upon, without fail, to be on the job every day no matter how I feel? The answers to these questions should go far to determine your program.

But whatever your decision, whatever your part in the community plan, it can be urged that you learn now, if you do not already know, the basic principles in good gardening and the demands that will be put upon you when you have to take your part in the food production in your community.

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Lester Rowntree

Coreopsis gigantea
(*Giant coreopsis*)

Spring Comes Twice in New Mexico

ESTELLE L. SHARP

AN opportunity for a quick trip to New Mexico arose this summer. It was August with a drought in the East. The West was having unprecedented rains. If I went I would see the yuccas in bloom. I might collect seeds of some of the plants I saw in flower out there several springs ago. It would be fun to see how many things I could recognize after working over the herbarium specimens collected in '37. I packed up and was off in no time, leaving a hot and humid but exceedingly dry countryside behind me.

New Mexico was cool. Great cumulus clouds floated across the sky frequently hiding the usually burning sun. The streams were full, the hillsides green. The yuccas, to be sure, were nearly over (a plague of grasshoppers had hastened their demise) but there were so many other flowers that it seemed spring had come again to New Mexico.

Baileya multiradiata was blooming along the roadsides, perhaps not quite as fresh looking as when I had been attracted by it before in early May, but still going strong. This is now in the trade. The year I tried it in the East, 1940, happened to be a wet season and it turned out to be nothing but another straggly yellow composite.

Argemone platyceras was most abundant everywhere. There was ripe seed on the lower branches of the same plant that was bearing gorgeous white blossoms and more buds to come at the tips. Such a habit in plants is most considerate to the plant collector. To be able to see the plant in flower and fruit at the same time is not only helpful in identification but also saves the

time that one would otherwise have to take to return for ripe seeds weeks later. Even when this is possible the results are often disappointing due to the plant's possible destruction by animals or insects in the interim.

A yellow cathartolinum on the mesa wall was likewise obliging and a lavender penstemon. (I hesitate in writing penstemon with one "t" for the word means 5 stamens and is often written "Pentstemon," but the earliest form with one "t" is correct. Priorities rule in botanical nomenclature!) One could see the older woody branches of these plants which bore the seed had bloomed in the spring, then with the arrival of the rains, fresh green shoots grew out and produced a second crop of flowers.

Calochortus nuttalli, however, was not so obliging. Many dry and empty seed pods were to be seen all over the mesa but it took some hunting to find a few seeds to carry home. *Fallugia paradoxa* (Apache Plume) offered ripe seed as well as flowers just as it had in the month of May; and the Rabbit brush (*Chrysothamnus*), which in some parts of New Mexico is crowding out the grama grass, essential for grazing, was full of yellow blossoms with ripe seed on the lower branches. This, by the way, is related to the now much talked of guayule, the rubber plant, and itself contains some rubber in roots and stems.

Although my time was short I was determined to ride up along the creek to the falls to collect some seed of the most gorgeous *Aquilegia chrysantha* which I had seen in bloom on a previous trip. What fun it was to try to remember the names of plants as we

rode along. They seemed like old friends not seen for a long time. Much better than some old college reunion, for there were no gray hairs or "middle age spreads" to disturb one! There are the sycamores just as I remembered them but the leaves are much more pointed than ours. *Platanus wrightii*—how smart I felt! And the pink locust, no second blooming for it, *Robinia rusbyi*. The two junipers were easy as I had been seeing them all over the state. *Juniperus pachyphloea* which has the pink mistletoe, (the white mistletoe grows on the oak) and *J. monosperma* (cedar) with shreddy gray bark. *Pinus edulis* famous for its nuts, is not so abundant right here but at higher elevations is almost monotonous it grows so extensively. And then the oaks! But they were my downfall! It was easier to identify the mesquite (*Prosopis*), Creosote Bush (*Covillea*) and Mountain Mahogany (*Cercocarpus*). Walnut, elder, mountain maple, willows, all similar to familiar varieties but the specific names would escape me.

Alongside my columbine whose pods fortunately still held a few seeds, grew *Lobelia splendens* and a tall yellow oenothera which I have yet to identify. *Arabis eriophylla* in the rock crevices close by had seeds to offer, and I did not have to look far to find two species of the wooly *Cheilanthes* ferns.

There was no time to ride up in the high mountains but we took a very civilized trip in the car to Willows Creek, a mecca for fishermen. Here, above 8,000 I had a few hours to prowl around. It was nothing short of agony to see so much and to be so hurried. The boys kept calling to come eat lunch or there

would not be any left. For once in my life food did not interest me!

We had driven up the mountain curves through a terrific thunder storm with hail. Now at the top the sun was out and everything shone with raindrops. *Abies concolor*, and both the Engelmann and the Colorado Blue Spruce had green moss dripping from their branches. It was cold, uncomfortably so when your hands and feet were wet from crossing streams and brushing against dripping bushes. The results of such a climate were in great evidence all about. The plants were so tall and robust that it took time to fold them into a normal size press. Penstemons, delphinium, forgetmenots, even wallflowers, had to be bent and curled around to fit in between the sheets. The deep red potentilla, mertensia, and polemonium were as exciting as when I found them in early spring, perhaps even more so when I remembered this was mid-August. *Campanula rotundifolia* grew so tall I hardly recognized it. Where in the temperate zone does this cheerful plant *not* grow?

Heuchera blossoms, a blush pink, abounded on the hillsides, their stalks bent over with the weight of the raindrops. Even showier was a creamy white spirea (*Sericotheca dumosa*). Great racemes of many tiny white flowers stood up well above the gray green foliage.

There seemed to be almost that superfluity of blossoming which one feels at moments in a favorable spring. Surely I had gotten my dates mixed, or else, spring comes twice in New Mexico!

Fruits and Vegetables of the Eighteenth Century

LOUISE B. FISHER

Now that the attention of a great many Americans is turned toward vegetable and fruit raising, it may be of interest to look back and see what our forefathers accomplished along the same line. Probably everyone has read stories of the wonderful fruitfulness of our country during the time of colonization, and as early as 1650 we find the following statement:

"From Virginia. By Edward Williams, Gent. London. . . . Oranges, Lemons, Pineapples, Plantanes, Peaches, Apricocks, Peares, Aples, in a word all sort of excellent Fruits will grow there in full perfection; you may sleepe while they are growing, after their setting or engrafting theree needes no more labor but your prayers, that they may prosper, and now and then an eye to prevent their casualties, wounds or diseases."

The pineapple was introduced to England about 1690, and of course grown in the "Stove." Philip Miller in 1737 writes of it, "but it hath been very lately that it was introduced into *European* Gardens, so as to produce Fruit: The first Person who succeeded in this Affair, was Monsieur *Le Cour* of *Leyden* in *Holland*, who, after a great many Trials with little or no Success, did, at length, hit upon a proper Degree of Heat and Management, so as to produce Fruit equally as good (tho not so large) as those which are produced in the *West Indies*, as hath been often affirm'd by Persons, who have lived many Years there: . . . When the Fruit is to be eat, you may take the Stalk thereof in one Hand, and the Crown of the Fruit in the other, and by gently twisting it, they will readily part,

and the Crown will come out more intire, and fit for planting, than if cut off, and the Fruit will be less injured. Then you may cut it into transverse Slices, in proportion to the Company that is to eat it, laying them singly on a Plate; the outside Coat must be pared off, as in many other Fruits, which would be troublesome in eating; the Inside of a good Fruit will cut almost as firm as a Nectarine, and is of a most delicious Flavour, and very full of Juice, and is justly termed the King of Fruits."

Our persimmons were also well thought of, and compared favorably with the English Medlar, according to John Bartram. He claimed that "one of our Persimmons is worth a dozen of them (Medlars), for goodness in eating, and as big." Peter Kalm, while traveling in this country, gives us a good description of them and their effects:

"Its little apples looked very well already, but are not fit for eating, before the frost has affected them, and then they have a very fine taste. Hesselius gathered some of them, and desired my servant to taste of the fruits of the land; but this poor credulous fellow had hardly bit into them, when he felt the qualities they have before the frost has penetrated them. For they contracted his mouth so that he could hardly speak, and had a very disagreeable taste. This disgusted him so much that he was with difficulty persuaded to taste of it during the whole of our stay in America, notwithstanding it loses all its acidity, and acquires an agreeable flavour in autumn and towards the beginning of winter. For the fellow al-

ways imagined, that though he should eat them ever so late in the year, they would still retain the same disagreeable taste."

William Byrd, in his *Natural History of Virginia*, describes two kinds of figs, "One is low and bears a good fruit, which is very large. The other grows tall and thick, gives a beautiful shade, and bears very abundantly. Its figs are somewhat smaller, but, on the other hand [they are], better. They are also more pleasant and sweeter."

In England, Loudon tells us, "the fig was cultivated entirely for the desert; but in fig countries it is eaten green or dried, fried or stewed, and in various ways, with or without bread or meat, as food. Abroad the fig is introduced during dinner, as well as at the desert. In common with the melon, it is presented after soup; and the person who cuts a fig, holds it by the small end, takes a thin circular slice off the large end, and then peels down the thick skin of the fruit in flakes, making a single *bonne bouche* of the soft interior part."

Strawberries, apricots, and cherries were enjoyed during their season in great variety. These fruits were also forced for use in April, Hill writing, "This little Desert will please, because of the early Season, beyond all pomp of Summer." William Byrd must have had cherry trees in abundance, judging from the quantities of cherries he consumed. He also on several occasions sent them to the Governor in Williamsburg. One wonders if the birds were as fond of them then as now, and finds the answer: "We found to our great surprise that the wild pigeons had eaten all the black-hearts"—in one of the May entries of the *Secret Diary*.

Peter Kalm, in his *Travels*, expressed great surprise at the number of fruit trees he found at every house, especially the great quantity of ripe

peaches. The leader of his party jumped over into an orchard, and gathered fruit for all the party, the workmen in the orchard not even noticing. There was so much ripe fruit that it was fed to the swine. He tells how the fruits were dried for winter use—cut into four parts, sewed onto a thread, and hung up to dry in the sun, with several trips to a warming oven during the process, and then "baked into tarts and pyes, or boiled and prepared as dried apples and pears were in Sweden."

There were many kinds of apples, pears, and grapes, some of which were stored for winter use. William Byrd, in his *Natural History of Virginia*, lists twenty-five sorts of apples, seven of which "One can preserve all year long." He adds, "There are probably many other species of apples in Virginia, which are too numerous to mention. For this reason I wanted only to describe the best species of them." An interesting item from Washington's *Diary* shows that thievery in orchards was common then as now: "From the Scarcity of Apples generally this year, and the depredations which were committing every Night upon the few I have, I found it necessary (tho much too early) to gather and put them up for Winter use." Byrd mentions twenty-nine varieties of pears, six of which could be kept all winter. Of grapes he writes that there are six species found in the forests, and many varieties, both European and Indian, planted in the gardens, where they do very well. They "grow so quickly that they bear fruit in the first year."

"Pomegranates," he adds, "are also found at the homes of the fanciers, and they become exceptionally beautiful and good in this land." Earlier, in his *Secret Diary*, Byrd mentions sending "four great pomegranates" to the Governor in Williamsburg. Catesby, too, recalls seeing them "in great perfec-

tion in the Gardens of the Hon. William Byrd, Esq; in the freshes of James river in Virginia." In 1762, Collinson wrote Bartram: "Don't use the Pomegranate inhospitably, a stranger that has come so far to pay his respects to thee. Don't turn him adrift in the wide world; but plant it against the south side of thy house, nail it close to the wall. In this manner it thrives wonderfully with us, and flowers beautifully and bears fruit this hot year. I have twenty-four on one tree, and some well-ripened." Hill adds, "If left ungathered it will burst upon the Tree and show its crimson Grains with vast Beauty."

Vegetables seem to have been grown in abundance. John Randolph, in his *Treatise on Gardening*, lists practically all of them that are in use today. His most important contribution to gardening in this country is to be found in his remarks on the climatic differences between England and Virginia. For instance, Philip Miller's directions for sowing spring Cauliflowers are altered, "allowing for the difference of climate, the ratio of which ought to be a month sooner in the Spring, and the same later in the Fall;" and he finds Virginia winters too severe to permit sowing radishes in October, as was done by London gardeners for an early spring crop. In describing the culture of the artichoke, he makes the interesting observation that he has "been informed the leaves clean pewter the best of anything." "The Jerusalem Artichoke (*Helianthus*) is only a species of Sunflower, with a tuberous root, not unlike the Potatoo. Some admire them, but they are of a flatulent nature, and are apt to cause commotions in the belly." He adds, "Carrots, *Daucus*, are of two sorts, the orange and white. In November take up your roots and put them in dry sand, and you may use them as occasion requires."

He gives instruction about blanching

celery and definite directions for growing cucumbers "if you require them in April." To have a succession of lettuce, he writes, "When I say sow the seed every month, I mean only the growing months, the first of which February is esteemed and August the last. In August you should sow your last crop, about the beginning of the month, and in October transplant them into a rich border, sheltered from the weather by a box with a lid, which should be opened every morning and closed in the evening, and the month of February you will have fine lettuces."

Asparagus was one of the most popular of the vegetables, and is mentioned repeatedly. William Byrd quite often dispensed with his rule of eating only one thing at a time, and to his fish or squirrel added "a little asparagus." This, too, was forced for early consumption, as Hill tells us, "Asparagus at Christmas is reckoned a great Delicacy; but it is very much inferiour to that which comes at a more natural Season. However, for those who chuse to supply their Tables at that Time, this is the Period of preparing for it. . . ."

Peter Kalm wrote that he found Okra planted in the gardens here. "The fruit, which is a long pod, is cut while it is green, and boiled in soups, which thereby become as thick as pulse. This dish is reckoned a dainty by some people, and especially by the negroes." He adds, "*Capsicum annuum*, or Guinea pepper, is likewise planted in gardens. When the fruit is ripe, it is almost entirely red, it is put to a roasted or boiled piece of meat, a little bit of it being strewed upon it, or mixed with the broth. Besides this, cucumbers are pickled with it: Or the pods are pounded whilst they are yet tender, and being mixed with salt are preserved in a bottle; and this spice is strewed over roasted or boiled meat, or fried fish,

and gives them a very fine taste. But the fruit by itself is as biting as common pepper." "Pease," Kalm tells us, "which they also sow, they have always had amongst them, before any foreigners came into the country."

- "The corn which the Indians chiefly cultivate is the Maize, or *Zea Mays* . . . But besides this, they likewise plant a great quantity of Squashes, a species of pumpions or melons, which They have always cultivated, even in the remotest ages. The Europeans settled in America got the seed of this plant, and at present their gardens are full of it; the fruit has an agreeable taste when it is well prepared."

Watermelons and muskmelons were both well known in the North as well as the South. Byrd often speaks of sending a slave out to gather watermelons, and of eating them immediately. This corresponds to the theory of young marauders of today, who assert that they are best eaten right in the field. Peter Kalm thought that watermelons in this country were extremely delicious. He saw one at Governor Clinton's in September, 1750, "which weighed forty-seven English pounds." He adds, "In the English plantations they likewise keep them fresh in dry cellars, during part of the winter. They assured me that they keep better when they are carefully broke off from the stalk, and afterwards burnt with a red-hot iron, in the place where the stalk was fastened. In this manner they may be eaten at Christmas, and after. Few people, however, take this trouble with the watermelons, because they are very cooling, and the winter being very cold too, it seems less necessary to keep them for eating in that season, which is already very cold."

After listing the fruits, nuts, trees, vegetables, etc., Byrd, in his *Natural History of Virginia*, closes with the

statement, "One finds *coffee trees* and *tea trees* or *bushes*, at the homes of many fanciers of beautiful fruits, especially in the aforementioned president's beautiful and fine garden, where one sees several species of them, as well as all sorts of curious and marvelous plants and trees from the whole wide world brought together there, which are however, too extensive to mention in this place."

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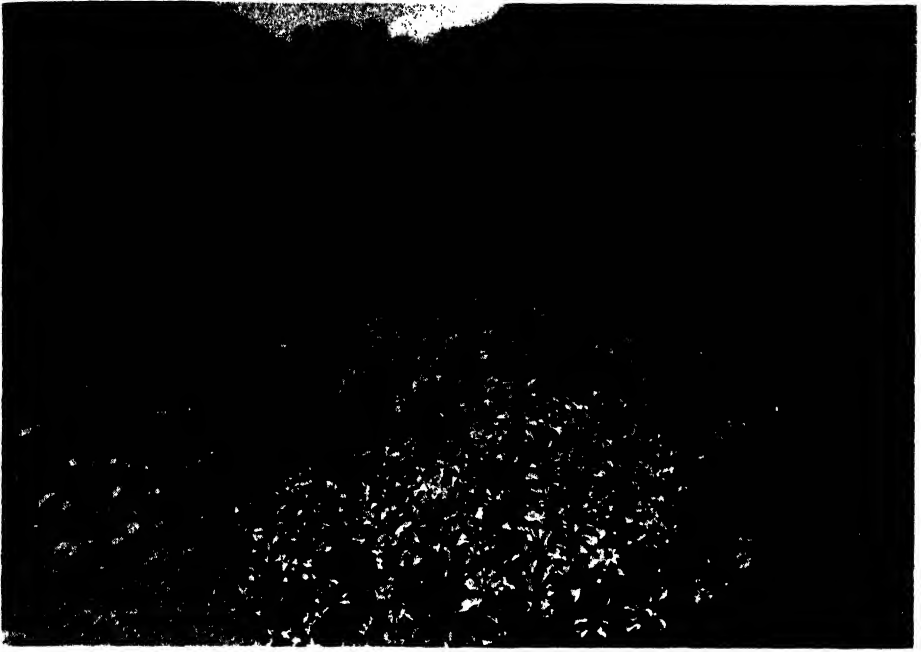
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Lester Rowntree

Encelia farinosa

California Daisy Pageant

LESTER ROWNTREE

It may be that the violent yellow of the American native, *Coreopsis lanceolata*, which dominates many summer gardens throughout the whole United States, has thrown me off yellow-flowered composites. If they were only the very pale lemon yellow of marguerites or the light chinese yellow of *Linum campanulatum* instead of that excessively bright shade of Aureolin, they would not rub me the wrong way.

Perhaps it is California and its plethora of yellow daisy species which has spoiled me for these flowers. The state is cluttered up with them; there must be almost two hundred species, some of which settle down in masses over acres of land so that in spring time,

along out-of-the-way roads and even occasionally on the highways, you travel through miles of them. I go through the country—or did before becoming rubber conscious, putting down my notes, "acres of yellow—just *Coreopsis stillmanii*," and "patches of gold; only *Coreopsis bigelovii*," meanwhile keeping a gimlet eye out for a daisy of a lighter and softer shade. This horde of western (and particularly southwestern) yellow daisies dampened my ardor for those which I saw in the east and I am sure that I grieved gardening friends there by not exhibiting more honest enthusiasm over *Chrysogonum virginianum* and its like.

Because I am blighted by this dis-



Lester Rowntree

Enceliopsis argophylla var. *grandiflora*

taste of many yellow wild daisies, I feel that I should somehow make it up to this overpowering large assemblage by pointing out some of the nice things about a few of its members, in that way helping to atone for my excoriations. The daisy shape could not be lovelier; it is simple, unpretentious and altogether charming—combining just the qualities we ask of a flower form. The foliage is often very attractive; the tall ones have much decorative value and the small annuals have endless virtues as gap fillers. The fact that they grow, particularly in the southwest, in such fascinating and abandoned places takes much of the curse off the yellow daisies and some individuals have such downright beauty that you forget their blatant relatives.

One of these is *Enceliopsis argophylla* var. *grandiflora* which is limited to the west side of the Panamint Moun-

tains, a range bordering on Death Valley, whose little cañons, as well as harboring this Panamint Daisy, reek with lore of gold mining days and still contain the remnants of ghost towns. The pearly two foot stems rise, straight and smooth, from the centers of tufts of leaves that have the silkiness of a puppie's ear over the texture of felt, and the luster of a frosty morning. The flowers may be five inches across or more and the rays are a good soft yellow. In the alluring spots where the Panamint Daisy grows, one may hear the trills of cactus, rock and canon wrens, and its plant associates are such entrancing things as *Delphinium parishii* which has all the shades of the new delphinium hybrids, the giant silver-leaved *Lupinus magnificus* and the intensely brilliant scarlet desert Indian paintbrush, *Castilleja angustifolia*. One spring day when I was gloating



Lester Rowntree

Coreopsis maritima

alone in a tiny desert canon whose rim was fringed and sides were adorned with this platinum-leaved daisy, a small yellow jeep-like contraption came cavorting down over the boulders—(there was no road). In it were two Indian girls, evidently with a flair for just this shade of yellow. The Panamint daisy flower just matched their car, they had tied bunches of it to the hood and sides, armfuls of it were piled on the seat between them and blossoms had been stuck in their hair. They waved joyously as they passed me and rollicked on down to the road at the cañon's mouth.

Another desert daisy, *Encelia farinosa*, is a shrub-like plant sometimes five feet tall when in bloom and often wider than it is tall. When in flower and viewed horizontally, the bush seems to be divided into three layers. The ovate leaves, like thin leather and

silvery—as so much desert foliage is, stop abruptly after recovering the rounded bush. Above this grey-white surface rise the shining bright yellow naked flower stems, making an eighteen inch network. Near the top, these stems branch, each branchlet holding a terminal bloom so that the top layer is one of golden daisies. This plant, whose common name is Incienso occurs very frequently on desert valleys, benches and mesas and its wide chalky shapes spatter the alluvial fans which spread out below many desert canons, ascending them a little way up into the narrowing gorges.

From the throng of annual yellow daisies native to the south-west and hitherto almost ignored by eastern seedsmen, *Baileya multiradiata* has, for some occult reason, been picked out, featured in catalogues and baptized "California Sunshine," a name by

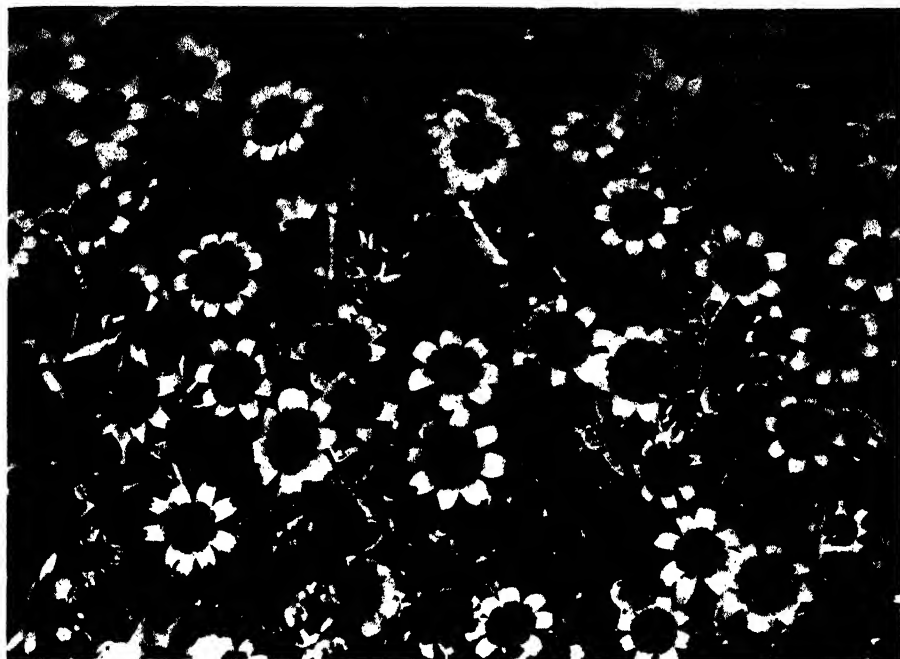
which a great many Californian wild flowers are known. It is useless to attempt to grow this desert (or semi-desert) plant unless you know something about its habitat. In the east there must have been many failures with it. *Baileya multiradiata* should be sown where it is to grow and only after the days have become really warm. If the drainage is good, it will grow in heavy soil but it prefers a light root run as it often makes very plain by coming up in gravel paths and not in the adjacent beds where most of the seed has landed. It should be happy on a hot sunny bank. This branching eighteen inch yellow daisy with soft white foliage, demands very little water after it is well started and much heat during its flowering period. *Baileya pauciradiata* is a rather stiffer and lower plant, with lovely white, hairy stems, and buds and flowers of a good light sulphur shade. The thing which particularly endears these *Baileya* to me is the double row of square-edged ray flowers and the uncompromising way the blooms have of staring straight up at the sky. In their native heath, (Arizona and south-eastern California) both of these species are perennial and grow with desert verbenas, evening primroses, gilias and phacelias.

Civilization is pushing back these blazing blocks of yellow and one must now go further off to see most of the wide patches of composites, but it is not necessary in April to go off highway 101 to see *Monolopia major* mobilized in masses. Close to King City, while with one eye, you try to ignore such signs as "bar-b-q" and "Tumble Inn," you see in front of you far hill-sides plastered with yellow. These bare overgrazed buttes have only recently turned from the corn color of California summer grass lands to glowing yellow. It is as though a squadron of

airplanes had passed over, spilling tons of yellow paint, which, after thoroughly staining the slopes had trickled down into the creases below. From the highway it looks as though nothing grew there except *Monolopia* and grass but if you climb up and walk about on the golden carpet, you will see several chalcid species, *Platystemon californicus* (creamcups) and the taller and very lovely lavender-blue *Salvia carduacea* (thistle sage). It is always windy up there and quite impossible to give the long exposure which a filter makes necessary so that, as often turns out when photographing yellow daisies, the darker central ring which with age develops on some yellow coreopsis species and is sometimes imperceptible to the eye, is always accentuated in a *Monolopia* picture.

The genera *Coreopsis*, *Layia* and *Bacrea* are the ones to supply the most extensive Californian fields of yellow daisies. *Coreopsis maritima* is an exception for it does not naturally go in for mass effect. If you live by the sea it is easy enough to achieve glowing stands of this daisy by scattering seed on loose, newly disturbed soil and raking it in. Its natural haunts are along the coast of San Diego County and Lower California lying south of it. "Along the coast," is meant to be taken literally here for the succulent two-foot plant often grows on bluffs so close to the ocean that the spray may shower the glistening three and one-and-one-half inch daisies and feathery yellow-green leaves.

Tall, gaunt *Coreopsis gigantea* is also fond of dramatic locations close to the sea and it, too, is limited to the southern coast. The place in which I love to see it best is on a tiny island of rock near to the larger island of San Miguel, the outermost of the Santa Barbara Channel Islands. This gallant plant is al-



Lester Rotentree

Monolopia major

most the only thing growing on the wind swept, wave dashed little spot. In this spectacular setting it holds its thick round bare arms aloft like some prophet predicting doom. After the rains come, each naked angular limb is crowned with a tuft of leaves which very much resemble those of *C. maritima* and in March and April a branched cluster of daisies, similar to but smaller than those of its sister coreopsis, springs from the center of the tuft. Breakers beat, storms rave, winds lash, pelicans swoop, their ungainly pouches wagging, but the sturdy trunk (which may be six inches through), supporting its candelabrum branches, stands dauntless and firm in the noise and loneliness. In cold climates this perennial should not be attempted out doors but *C. maritima*, though a perennial here, has been grown successfully as an annual close

to the Atlantic Ocean where it bloomed when four weeks old.

Of the several other coreopsis,—the annual ones that swarm across the country, some are daintier than others. *C. douglasii*, for instance, makes nice flat, round little plants with thread-like foliage and has wide, flat, bluntly notched rays of soft lemon yellow. Each species has its chosen situation, with soil and exposure to suit its needs.

I think the yellow annual daisy I am most fond of is delicate *Pentachaeta aurea*. For a yellow daisy, it blooms a little late, coming just as the brodiaeas and creamcups go and as the linanthus, which at a distance it somewhat resembles, come on. It grows in the foothills,—in the Yellow pine, Kellogg oak and Incense cedar zone and likes grassy banks at the edge of these woods. The pointed rays are very nar-

row at the base, there is a double row of them round a diminutive center. The slender seven-inch stems branch close to the ground and the charming blooms wave about among grasses and other wild flowers. The gregarious proclivity of some of the clan is not marked in this yellow daisy and it makes a choice annual for the wild flower garden. Whenever I try to describe a flower I am fond of, I feel like a salesman and so make haste to add that I have no seed of *P. aurea* in stock this year.

As I write, mental pictures of many other yellow Californian daisies keep cropping up; a colony of the San Diego

Viguiera laciniata in April,—round-topped, much-foliaged bushes with little sunflower stars above the beautifully wrinkled and wavy-edged leaves; a stand of large-flowered *Wyethia* in August on the lower slopes of Mount Lassen and close to them clean snow banks and the dark boughs of hemlocks. From February, when tall *Geraea canescens* colors the floor of Death Valley, until the *Madias* and *Hemizonias* in the foothills wind up the season, the pageant of daisies, like a slow movie passes across the face of California and as it rolls along, I admit that, after all, yellow daisies have their points.

When Does *Lilium Catesbaei* Bloom

A FIRST COUSIN to our northern Wood Lily (*Lilium philadelphicum*), the Catesby Lily (*L. Catesbaei*), is regarded as a more southern form of it, occurring along the Atlantic and Gulf coastal plains from North Carolina to Louisiana, and through Florida to the Everglades. It is also reported to bloom at the same season, Bailey's *Cyclopedia of Horticulture* giving its season as June and July, which checks with the records for North Carolina in the herbarium of the University of North Carolina. But in that same herbarium is a specimen from Kissimmee, Florida, dated September 18—so when *does* this lily bloom? When friends of mine undertook to collect pollen of it for me at Bradenton, Florida, the past summer, they were not able to find any Catesby lilies—locally called tiger lilies—in bloom until the last of September and early in October, which still further extends the season. A check-up in the herbarium of the University of

Florida, at Gainesville, and with Prof. St. John at Floral City, Florida, gave dates through July and August.

There are apparently reports of this lily flowering over a long blooming season, from June to October. The latest bloom is in its most southern extension, along the Florida coast. What is its proper blooming season, and why does it bloom in early summer, in June and July, in the Carolinas, and progressively later southward, until around Bradenton and Naples, Florida, it blooms in October? To try to answer this question, I inquired into its bloom in cultivation. Dr. Albert Vollmer had it in bloom at his home in San Francisco on October 2, 1939. I moved a few in pots from Bradenton, Florida, to Islip, Long Island, last May, and these flowered at Islip, after a typical northern summer, from late September until the last of October, thus agreeing with the time of bloom in their native habitat, bordering the open sandy bogs

in the pine flat woods of southern Florida.

Are there two races of this lily, grading into each other from the North to the South of its range, and will these retain their different blooming seasons, if brought into the same locality? These are questions still to be answered. Meantime, the Southern Florida plants of this lily are now, December 20, in their winter foliage, with groups of oblanceolate, fleshy basal leaves growing from the tips of the new scales of the small, loose-scaled yellow bulbs. The bulbs are about $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, with basal roots only, and are about two to three inches underground, usually at the base of the tangle of grass roots extending to about this level below ground, in the fine grayish sand. The lilies seem to grow singly, scattered on the moist, grassy flats among sedge, saw palmetto and low herbage. Seldom are there more than two or three of the tiny bulbs together, and all flower stems found have been solitary, each bearing a single upright flower, which ripens its seed in November and December. The seed germinates promptly, but makes only two or three of the basal leaves the first year. How long it takes seedlings to flower is as yet undetermined, but this is evidently the principal manner of increase.

The flowers vary in color, from bright red like the Wood lily to orange, pale yellow and even white. The usual

color is red, with a yellow center, bearing large brown spots, as large and conspicuous as those on *Lilium pardalinum*. An albino of this lily has been found here by Dr. B. G. Arnold, with flowers nearly pure white, with only a faint creamy tint, and faint creamy instead of brown dots near the center of the flower. White-flowered forms are rare in the upright-flowered group of lilies.

Because of its unusual blooming season in the late fall and the usually bright color and attractive form of its tapering-petalled, large upright flowers, this lily is well worth cultivating, but has proven difficult to manage, even in mild climates. It is not very hardy, and is suited only to pot culture in regions with frozen soil in winter. Its main requirements seem to be a very loose, acid sandy soil with some acid leaf mould in it. During its long growing season, which extends through most of the year, it requires both abundant moisture and perfect drainage. Judging from a few successful experiments with it here, it should be moved in late fall or early winter, after the flower stalks have died back, and before the winter rosette of leaves is too far advanced. If moved at the right time, it forms a good new set of roots before the flower stalk starts growth, which is in late May or early June, with the southern Florida plants of this lily.

Bradenton, Florida.

The Longevity of Plants

ROBERT M. SENIOR

IN RECENT YEARS the longevity of plants, flowers and seeds has been subject to considerable investigation. Of two related species why should one be much longer lived than another? Why, for example, should the relatively small Cornelian Cherry (*Cornus Mas*), frequently live over 150 years, whereas some tall species of maple seldom attain an age of more than 100 years? Similarly, why should certain flowers remain fresh for days, whereas others will wither in a few hours? Again, why do some seeds retain their viability for years, whereas others must be planted at once, in order to assure germination?

In a book entitled "The Longevity of Plants," Dr. Hans Molisch endeavors to answer some of these questions. In the course of his investigation, he had occasion to ascertain the age of many trees, shrubs and herbaceous plants. For example, he mentions the Sequoias as being the oldest trees in our country, frequently reaching an age of 4,000 to 5,000 years. Among other evergreens, the Cedar of Lebanon sometimes attains an age of 1,200 years, the Swiss Pine 700 years, and the Scotch Pine 500 years.

Most of the deciduous trees have a shorter life than the evergreens above mentioned. And yet the tree rings of a certain elm indicated that the tree was about 600 years old. In another instance a hawthorn, *Crataegus oxyacantha* lived over 300 years.

Among the bulbous and herbaceous plants, we seldom find any living beyond a half century. And yet it is asserted that a fair number of plants reach ages approximately 30 to 40 years. For example, it has been def-

initely reported that the heather, *Calluna vulgaris*, has occasionally attained an age of over 40 years. I daresay some who read this article may have plants in their garden that have attained an advanced age. Possibly the readers of this magazine might be interested in learning about such plants.

What are the factors that tend to produce long lived perennials? Possibly many might be inclined to associate longevity with size or height. It is no doubt true that trees live longer than herbaceous plants. But size cannot be the chief factor governing longevity. We have mentioned the low growing *Crataegus oxyacantha*, living over 300 years. Similarly, a low growing herbaceous plant may far outlive a tall growing plant.

The greatest factor conditioning the longevity of plants apparently is determined by its reproductive capacity,—in other words, by the earliness, quantity, and frequency of the seed bearing process. It is interesting to note that a somewhat similar phenomenon is observed in the animal kingdom. The insect that is born, and bears numerous offspring, all in the same year, dies in a comparatively short time thereafter. Vice versa, man is born only after the parent has passed a long period of youth and adolescence. Similarly, the annual plant bears huge quantities of seed, and shortly thereafter perishes. The biennial develops vegetative growth the first year, and dies the second year after bearing seed. Sometimes a monocarpic plant continues in the leaf stage for several years: but it too dies after it flowers and seeds. One of the longest lived perennials in my garden is a hybrid that bears no seeds at all.

Generally speaking, trees delay their fruiting period until they attain a considerable age. On the other hand, most peach trees bear at an early age, and are relatively short lived.

It is for the reasons above mentioned that gardeners who want to keep a plant in vigorous condition, are urged to cut the flowers as soon as they begin to fade. Similarly advice is often given to use fertilizers after a plant seeds, in order to restore some of its vitality.

What causes some flowers to live much longer than others? One or two factors have been observed. For example, a flower bearing many stamens, as well as considerable pollen, will generally be more short lived than one with many stamens. The poppy is an example of a flower with numerous stamens. "You seize the flower, its bloom is shed." On the other hand, many orchids, bearing only one fertile stamen, remain fresh a long time.

Might we draw the conclusion from a study of flowers, that plants bearing a few blooms, should keep these fresh longer than plants bearing a multitude of blossoms? Probably such a sweeping conclusion would hardly be valid. I have in mind the profuse flowering asters and chrysanthemums that remain in bloom a long time. However, I have observed in some instances, that of two

plants of the same species—one bearing many flowers, the other very few—that of the two, the latter seems to bear its flowers longer.

Some interesting observations have been made on the longevity of seeds. Of course all of us know that certain seeds, such as the primrose, lose their viability very rapidly. On the other hand, it is related that at the Jardin des Plantes, in Paris, they came across a few packets of seed that had been stored in some nook, and had been forgotten for over thirty years. When planted, a large percentage germinated. I also remember the story of the Swiss horticulturist Correvon, who stated that a gentleman planted outdoors some seeds that he knew were slow to germinate. Their position on his grounds was marked by a stake. Eight years later these seeds germinated. Possibly the most remarkable report on the viability of seeds is that relating to the Indian Lotus (*Nelumbo*), which experts estimated had been buried in peat beds for fully 60 years. When the hard seed coats had been filed, the seeds were planted, and germinated in four days. On the other hand, the story of the wheat seeds that were found in Egyptian tombs, and which germinated when planted is without any foundation of truth.

A New Commercial Oil Palm in Ecuador

O. F. Cook

OIL-BEARING palm-kernels from Ecuador, representing commercial shipments, were brought recently by my colleague Dr. George S. Jamison for botanical identification. Earlier samples of such kernels had remained unnamed, but now associate with herbarium material of a new genus, one of the large forest palms to which the traditional names *Attalea* and *Maximiliana* have been applied, but with several characters not previously known. The new palm may prove important as a natural resource, and worthy of domestication as a food and fiber crop. In many tropical regions tillage agriculture with field crops is not feasible, but permanent systems of tropical agriculture may be developed with palms and other tree-crops.

All of the commercial oil palms are members of the coconut family, the largest and most diversified group, with hundreds of wild species in South America. The babassu palms of Brazil, *Attalea speciosa* and related species, are reported to cover wide areas in Maranhao, and the kernels are reaching the United States in substantial quantities, replacing Oriental palm-oils. Three of the cooid palms have been domesticated. The coconut, *Cocos nucifera*, now widely cultivated, is not known in the wild state. The so-called "African oil palm," *Elaeis guineensis*, is reported to grow wild in Brazil, and may have been carried to Africa in early colonial times. Its history was reviewed in THE NATIONAL HORTICULTURAL MAGAZINE, January, 1940. The third domesticated type is the chonta or chontaruru palm, *Guilielma speciosa*, with edible fruits. This probably was an ancient culture, since many seedless

varieties are grown among primitive tribes, from Brazil and Bolivia to Costa Rica.

An outstanding feature of the new palm is the enormous pendent cluster of fruit, like an over-size "bunch" of bananas, shown in figures 1 and 4. The individual fruits are less than two inches long, but great numbers are massed together, the entire cluster estimated to weigh 250 pounds, "too heavy for two men to lift." The fibrous husk is thin and readily removed, leaving a smooth, oblong nut similar to a pecan, but with three "eyes" at the base like a small coconut, and a large central cavity filled by an oval kernel. The assay of the kernels in the Bureau of Chemistry showed 51.74 per cent of oil and 4.28 per cent of moisture.

The single colossal fruit-cluster is in notable contrast with smaller and more numerous inflorescences in the better-known oil palms, as *Elaeis*, *Alfonsia*, *Temenia* and *Borhoa*. A notable saving of material in peduncles and enveloping spathes may be reckoned. The inflorescences of the other genera not only are relatively small, but very compact, the clusters so crowded that many of the fruits are dwarfed or deformed by the mutual pressure, with resulting irregularity in the sizes and shapes of the nuts, so that cleaning and cracking are rather difficult and wasteful. Such pressure and distortion are avoided in the new palm by a marked elongation of the basal joint of the branches of the inflorescence. The specialized branches, the large size of the cluster, and the long peduncle, are three features that tend to facilitate mechanical harvesting and extraction of the kernels. The short-stalked fruit-clusters of *Elaeis* are

closely wedged among the indurated leaf-bases, and gathered with difficulty. Also in *Bornoa* the fruit cluster is very compact and is covered by the remarkably thickened spathe. A planting of *Bornoa* is projected in Haiti, since the nuts are of excellent quality, but they may need to be gathered from the ground.

NAMING THE NEW PALM

The plant material of the new genus was collected by Mrs. Ynes Mexia at the hacienda Santa Lucia, Canton Vinces, Distrito Los Rios, in the coastal plain of Ecuador, October 20, 1934, No. 6574. A section of the trunk is included, margins of the leaf-sheath, sections of the midrib with attached pinnae, branches of the inflorescence, and nearly mature fruits. The male flowers are not represented. The local name was *palma real*, meaning "royal palm," and possibly is distinctive in that district, but is shared in other Spanish-speaking countries with several large palms, *Roystonia*, *Jessenia*, *Cocos*, *Attalea*, and *Scheelea*.

In addition to the photographs associated with these specimens, three others are labeled "*palma macora*, not collected." These apparently represent the same palm, and are reproduced in figure 1, a mature palm at the upper right and a young palm below, showing the trunk beset with remains of the coarse leaf-sheath fibers, which may have suggested an *Astrocaryum* or other spiny palm. The name *macora* apparently has not been recorded, but possibly is a variant of *mapora* associated in Karsten with a palm from Colombia, *Oenocarpus mapora*, not of the coconut family. Local variations in forms and applications of names are not infrequent, and entirely erroneous "*informes*" may be furnished by town-dwelling natives who go out as "guides" for travellers.

The name *Ynesa colenda* is suggested for the Ecuadorean *palma real*, to commemorate the work of Mrs. Mexia, a woman with unusual interest, energy and courage, who devoted her later years to extending our knowledge of the plant world of tropical America. The many difficulties of getting large palms felled and dissected in the forest, making measurements, taking photographs, writing notes and preparing specimens, usually are avoided. Nobody before Mrs. Mexia had taken the trouble to bring home good palm material from Ecuador or from the neighboring regions, which have the richest palm flora in the world. Even the ivory palms, which usually are confined to the darkest and wettest forests of the Andes, were not disregarded by Mrs. Mexia. Some of the difficulties she encountered in obtaining photographs of large forest palms in Ecuador are stated in a letter written at Quito, June 13, 1934:

"I regret that so many of my photographs of the palms are so poor, but the difficulties in photographing them are terrific. The palms are generally in dense forest, which shuts out almost all the light, and added to that, the weather is almost always cloudy, while the humidity is high. Often it is misting or raining in these tropical forests. The palms are so big and the surrounding vegetation so thick that one can get no chance even to see them. I have sent some very poor photos, which I would have preferred to omit, but I thought they might give some wanted indications or habit."

The last expedition undertaken by Mrs. Mexia was in Oaxaca, where a fatal illness was contracted. A biographical notice by Mrs. H. P. Bracelin appeared in *Madroño*, 4:73. October, 1938.

Under the forest conditions it often

is difficult to find a palm that can be felled without cutting other trees and losing too much time. The large kinds of forest palms produce no flowers or fruits until they grow above the forest canopy and reach the sunlight. Many large types are excluded from deep forests, and restricted to areas where the forest growth is somewhat open, on account of poor soils, dry climates, or long periods of flooding that limit the growth of other trees. The smaller forest palms are more tolerant of shade, and complete their development as undergrowth. Much of the forest vegetation is remarkably localized, to an extent that has not been appreciated.

CHARACTERS OF YNESA

A mature palm attains, according to Mrs. Mexia's notes, a height of 125 feet and a circumference of five feet, above the sloping mass of superficial roots at the base of the trunk, as shown in figure 2. The trunk is remarkably columnar, somewhat narrowed when the fruiting stage is reached, but probably less than indicated in figure 1, since allowance should be made for foreshortening. The superficial roots of the palm are somewhat more slender than those of an epiphytic aroid partly cleared away in figure 2, but shown in another photograph. The leaf scars in figure 3 are closely crowded, less than one cm. apart, longer on the petiole side to 5 cm., the surface distinctly convex, pitted with the sockets of coarse fibers. The "bark" is said to be "blackish" on the outside, but the indurated surface layer is dark brown, the interior a light straw color. The section shown in figure 3 probably came from the upper part of the trunk where the leaf scars doubtless are more crowded than near the ground, as faintly indicated in figure 2. The notch at the left of the section in figure 3 may mark the attach-

ment of an inflorescence. The leaf-base measured nearly seven feet, the margins fringed with curved, wiry fibers about 3 mm. thick at the base, shown at the right in figure 4. The fibers taper in three or four feet to slender threads.

Leaves 16 to 20, in a spreading crown, the midribs 28 feet long with 150 pinnae on each side, rather evenly placed along the rachis, except that the basal pinnae are narrow and close. Pinnae at one-third of the leaf-length, 4 to 5 cm. apart, attaining 135 cm. by nearly 8 cm., the greatest width about 50 cm. from the base; pinnae at two-thirds of the leaf length, 145 cm. by nearly 9 cm.; attachment of pinnae to the midrib nearly vertical, oblong, 2 cm. high, 1 cm. wide, the lower margins incurved, nearly closed, midribs of pinnae projecting above the blade as a sharply angled, corneous flange 4 mm. high, 2 mm. thick, of extremely firm texture, bordered on each side by a narrow furrow fretted with minute cross veins, forming a hinge between the midrib and the submedian veins, these slightly thickened below, lying against a very narrow inferior flange of the midrib. Upper surface of pinnae smooth and shining in the fresh state, the lower dull green. Texture of pinnae firm, rather closely veined, the slightly more prominent veins 3 to 6 mm. apart, cross-veins indistinct, marginal vein strongly developed, prominent on both sides. Since the pinnae, if opened flat, would require about twice the space that they have on the rachis, they doubtless remain permanently folded. The stomata appear whitish, in numerous close rows between the veins of the lower surface.

Basal pinnae greatly reduced, less than 1 cm. apart, the lowest pinna 70 cm. long, less than one cm. wide, fifth pinna slightly longer, 1.7 wide; texture

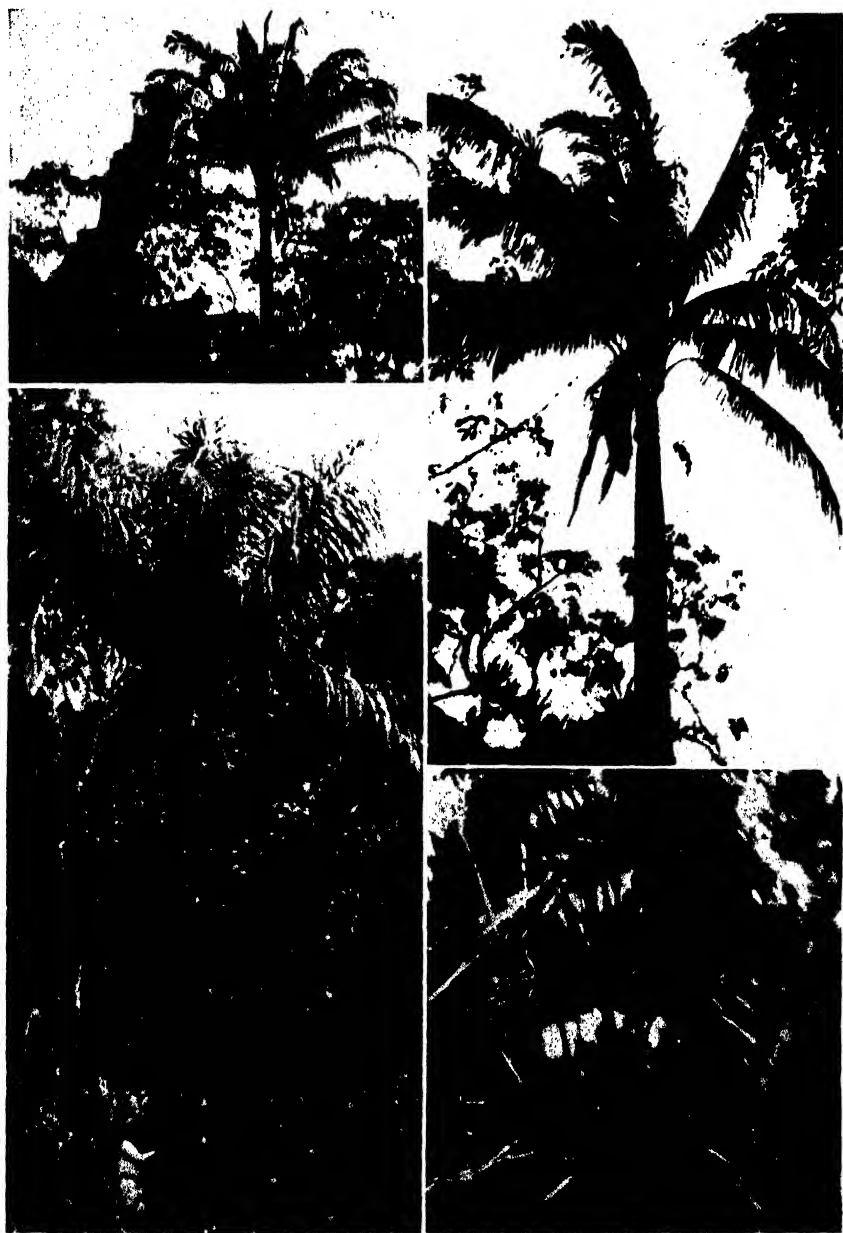


Fig. 1. Ynesa palms, mature and juvenile

of lower pinnae thinner, and the cross veins more distinct, crossing the midrib and the submedian veins. Base of rachis 9 to 10 cm. wide, the margins rather thin, the basal pinnae inserted below the margin, the attachments narrow, to 6 mm.; rachis convex in the middle above, prominent below, about 3 cm. thick, the lower surface nearly flat, with a firm brown tomentum. Apical pinnae gradually reduced 3 to 4 cm. apart; fifth pinna before the last 62 cm. by 2.5 cm., terminal pinna 51 cm. by 1.4 cm.; rachis narrowed to less than 2 mm., percurrent as a slender bristle 40 cm. long.

Only the inner spathe was noted by Mrs. Mexia, as nearly 10 feet long, "3 yds., 7 in.," but the outer spathe can be seen in figure 5, about one-third as long as the inner and notably broader, the lateral margins thin and the end torn into fibers. The inner spathe is said to have been "very hard and woody," and the slender, tapering form is in marked contrast with the short, thick, deeply plicate spathe of *Bornoa*. The peduncle appears to have been about three feet long, and two or three inches in diameter. A "slender dry stalk" also was noted as probably bearing the male flowers. "Natives claim that this palm produces a cluster of male flowers one year, and of female flowers the next, thus fruiting in alternate years."

The fruit cluster appears to have been about five feet long and fifteen to eighteen inches in diameter. The number of branches was very great, probably in hundreds, with 8 to 10 fruits on each branch of those collected. Two of the fruiting branches are shown in natural size in figure 5, with fruits, nuts, and sections. The long, naked base of the branch is a specialized feature not shared among the related genera, *Bornoa*, *Ethnora*, and *Temenia*.

The mature perianth covers only the base of the fruit, less than a third of the total height. The sepals are markedly narrower than the petals, but nearly as long. The staminal cup, also shown in figure 5, is relatively large, nearly equal to the petals. The mature perianth is much smaller than in *Ethnora*, where half of the fruit is covered, although relatively large, 7 cm. by 3.5 cm. The female flowers are subtended by a broad acuminate bract and three thinner mucronate bracteoles, the upper bracteole sometimes larger and more prominently angled, resembling a sepal.

The dry fruits, said to have been not quite mature, attain 4.5 cm. by 2.2 cm., with the pericarp only 1 to 2 mm. thick, the nuts 4 cm. by 2 cm., the cavity 2.3 cm. by 1.4 cm., the walls 2 to 3 mm. thick. The nut is oval with a stout conic rostrum projecting 7 to 8 mm. above the cavity, ending in three small tubercles. The surface of the nut is finely grooved and ridged with slender, longitudinal fibers, impressed or adherent, while the nut of *Bornoa* is smooth to near the base. Cross-sections show one or both of the abortive carpels with the lumen much broader than in *Bornoa* or *Ethnora*. One of the kernels in figure 6 is flattened, showing that two carpels sometimes develop. The kernels in this commercial sample from Esmeraldas are 2.5 to 3 cm. long, 1.5 to 2 cm. wide, the testa prominent and closely plicate along the raphe, the remaining surface with an open, irregular network of coarser and finer grooves, shown in figure 6 in comparison with much narrower and smoother kernels of a babassu palm from Brazil. The basal embryo is distinctly prominent, more than in the babassu kernels, and the endosperm has a softer and more open texture, so that greater care in storage or shipment may be needed.

The immature fruits were described



Fig. 2. Base of Ynesa palm in forest

by Mrs. Mexia as "dull green," turning orange at maturity, with a light yellowish "gummy" flesh, which doubtless is similar in texture to the oily pulp in many related palms. The pulp oil is different from the kernel oil in color, taste and other properties in all of the economic species, and in the African oil palm is much more important than the kernel oil.

The district where the palm was collected had an altitude of 150 feet, and a six-months dry season. The palm is said to be common, but growing scattered in dense forest. A wider distribution is indicated by kernels being shipped from different ports, Guayaquil, Manta, and Esmeraldas, as shown by commercial samples. Local variations may be found when palms of different districts are compared, unless the type has spread through human agency in recent times, like *Elacis* in West Africa.

Illustrations of two genera related to *Ynesa* have appeared recently, *Borinoa* in THE NATIONAL HORTICULTURAL MAGAZINE, October, 1939, and *Ethnora* in the *Journal of the Washington Academy of Science*, July 15, 1940. The ample female inflorescence of *Ynesa* is in marked contrast with short, compacted inflorescences in *Borinoa* and in *Temenia*, a Brazilian genus originally described and illustrated by Martius under the preoccupied name *Maximiliana*. In *Ethnora*, the palm known as maripa in Guiana, the inflorescence is less congested but the branches are not stipitate as in *Ynesa*. Also *Ethnora* has the endocarp crassate, the foramina superficial, and the endosperm narrow. The female perianth is very large in *Ethnora*, sheathing the fruit to above the middle, but is very small in *Temenia*, and only moderately developed in *Borinoa* and *Ynesa*.

A RECORD OF *Ynesa* IN 1789

An early record of palms in Ecuador apparently has been overlooked in compiling some of our reference works, a chapter in Velasco's "Historia del Reino de Quito," printed at Quito in 1844, but written in 1789. Velasco had information of more than fifty species of palms, and mentions about thirty of the more important kinds with their habits and uses. Spanish names are given in a few cases but most of the names are from indigenous languages. Most of Velasco's names have been reported by later writers and are included in Dahlgren's list, but some may be no longer in use. The later reports are not in all cases from Ecuador, but from Colombia, Brazil or Peru.

Instead of fifty or even thirty palms from Ecuador, Dahlgren mentions only 22 species as actually reported by botanists. Several species of ivory palms illustrated and named by Gaudichaud, probably from Ecuador, are not included. (Velasco's *palma real*, described as a mountain palm with flexible lustrous leaves, generally used in Holy Week celebrations, would not correspond to the type obtained by Mrs. Mexia. The leaves of *Ynesa* are too large, heavy and rigid to be convenient for decorative use.

The palm that Velasco associated with the name *sapaja* or *shapaja* seems to have represented *Ynesa*. It is listed among the coconut palms, *palmas de cocos*, and noted as very tall, also as furnishing the best fiber for brooms. The bases of the leaves are said to be so hard and fine that arrows are made of them, and they are worked into combs like tortois-shell or ivory. The large clusters are mentioned, and fruits the size of hen's eggs, as would result from the pulp thickening at maturity. The kernels are described as "very rich

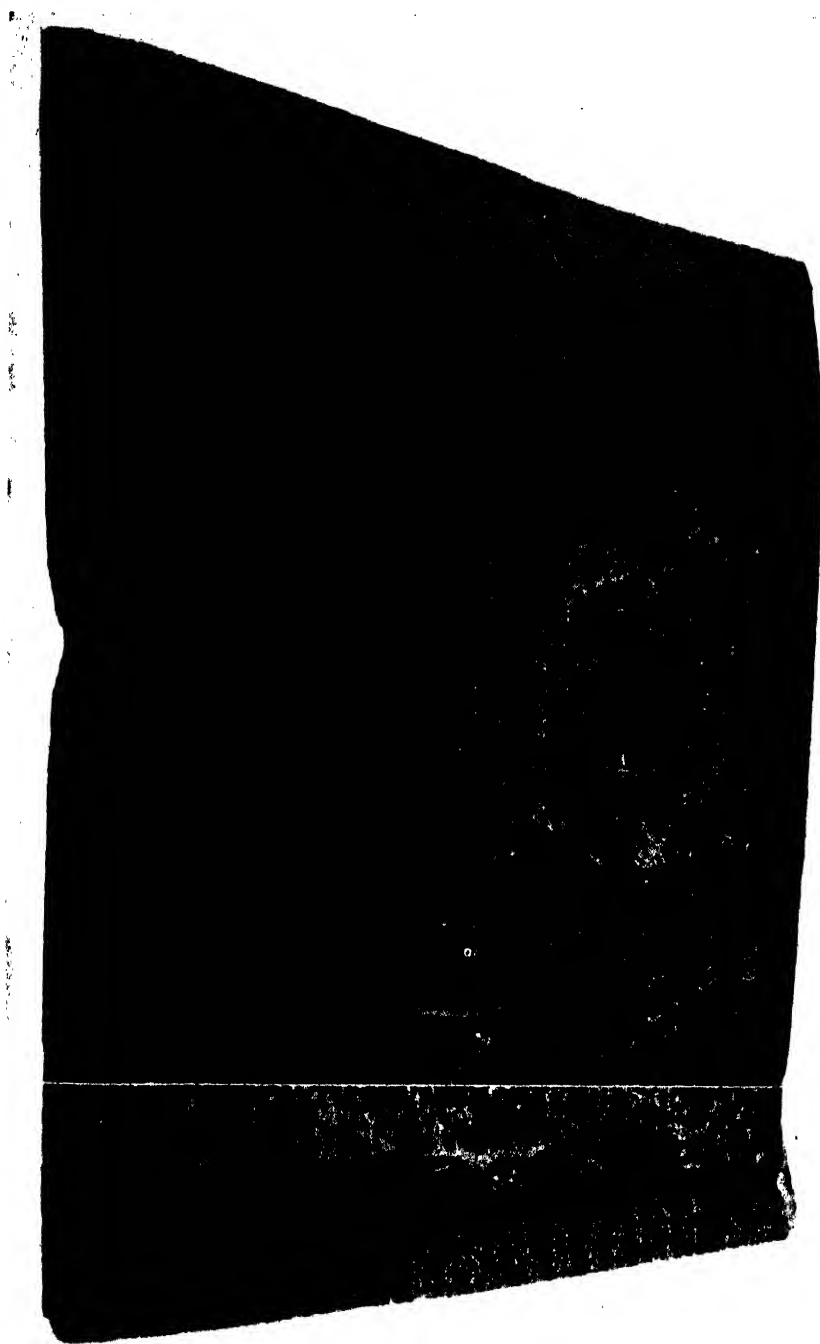


Fig. 3. Trunk section showing leaf-scars, natural size

pine nuts like those of the pine tree." an apt comparison for the texture of the endosperm, and the taste doubtless is sweet and pleasant in the fresh state, as in *Bornoa* and *Ethnora*. The surface of the fruits is said to be irregular and variously wounded, suggesting attacks of birds or insects.

YNESA RELATED TO A FIBER PALM

Another type that appears to be definitely related to *Ynesa* is the Brazilian palm described by Martius (2:136) more than a century ago as *Attalea funifera*, a species widely known as the original source of piassava, a coarse, rigid fiber used extensively in Europe and in the United States for brushes, brooms and street-cleaning machinery. Similar fiber material has been obtained from *Leopoldinia* and several other palms not related to *Attalea* even as members of the coconut family, but *Ynesa* is a cocoid palm with a fiber closely resembling the original Brazilian *piassava*.

The similarity of the fiber does not mean that *Ynesa* is closely related to the large series of palms that have been described under the name *Attalea*, but that the fiber-bearing species, *Attalea funifera*, is widely different from most of the others, although its generic assignment apparently has not been questioned. The reason may be that the piassava palm has a large, oval nut very similar in general appearance to the babassu nut, but in structure not alike. The resemblance will appear as another example of parallel evolution, after the differences are appreciated.

Martius noted a peculiar feature of the nut of *Attalea funifera*, that it is marked on the surface by three longitudinal grooves. These grooves are significant of the fact that the structure of the endocarp is essentially different from that of the babassu nut and the

many related forms that have the endocarp reinforced by an indurated layer of mesocarp fibers, fused and incorporated with the endocarp. Lacking this fibrous layer, the endocarp of the piassava palm is of uniform texture, as in *Ynesa*, *Bornoa*, *Temenia* and *Ethnora*, but the thickness of the uniform layer is much greater. The grooves that Martius noticed mark the sutures between the carpels as not completely closed, nor covered by fibers. Some of the mesocarp fibers are attached at the base of the piassava nut, but are not incorporated.

The uniform texture of the endocarp as well as the remarkable fibrous structure of the bases of the leaves require an association of the piassava palm with *Ynesa* and the related genera, so that other similarities and differences may be noted. *Sarinia* is suggested as a generic name for the piassava palm, in allusion to the chief use of the fiber for making brooms and brushes, with *Sarinia funifera* (Martius) as the type species. Notable differences appear in specimens of the nuts, which may represent local races or subspecies. Burret has described a trunkless palm as a distinct species, *Attalea acaulis*, but Bondar considers it not distinct from *funifera*.

CHARACTERS OF *Sarinia*

A detailed account of *Attalea funifera* is included in a paper by Gregorio Bondar, "Palmeiras do genero *Attalea* e sua importancia economica," published in "O Campo," October, 1938. A photograph shows the palm, much smaller and more slender than *Ynesa*, the leaves mostly erect or ascending, with rather short, drooping pinnae, not in regular alignment along the rachis as in *Ynesa* but set at different angles, in separate "interrupted" groups, the arrangement that appears in *Temenia* but not in *Bornoa* or *Ethnora*. The



Fig. 4. Fruit cluster of Ynesa. Fibers of leaf sheath, natural size

pinnae are only 50 to 60 cm. long, and 4 to 5 cm. wide, the upper pinnae reduced to 20 cm. The fibrous margins of the petioles are considered as a special feature of this species. The trunk is 6 to 10 meters tall, 25 to 30 cm. in diameter. Martius described the leaves as 15 to 20 feet long, the pinnae as 3 feet long.

The inflorescence of *Sarinia* has the branching axis only 50 cm. long, the branches 10 cm., with only one or two female flowers. The male branches are described as remotely scrobiculate on one side, with two flowers from each pit; the male flowers are more than 20 mm. long, petals 4 to 5 mm. wide, flattened at base and apex, the stamens 8 to 9 mm. long, anthers sagittate-linear, with short filaments. The fruit is much larger than in *Ynesa*, 10 cm. by 5 to 6 cm., ovoid, the apex more acute than in *Ynesa*, the basal quarter covered by the perianth, the sepals broad, nearly equal to the petals, the staminal cup large, the margin notched. Nuts in the seed collection of the U. S. Department of Agriculture measure 9 cm. by 5 cm., others smaller, to 5 cm. by 3.2 cm. All are distinctly rostrate with the three intercarpellary grooves very distinct. Three carpels may be fertile, but usually two or one, the kernels then attaining 4 cm. by 1.8 cm.

Regarding the fiber of the piassava palm, Martius reported that a length of twelve feet was attained, while the leaf base was noted as four feet, so that a very long antiligule is indicated, eight feet or more. The name antiligule is given to a special structure of the leaf-sheath only recently recognized, forming an upward projection of the rim of the leaf-sheath on the side opposite the attachment of the leaf-blade. An example of an antiligule represented by a fringe of stiff spine-like fibers was illustrated in this *Magazine* for January,

1941, in a Haitian fan-palm, *Oothisrinax anomala*, but the antiligule in that case is only a few inches long.

The fibers that emerge from the margins of the leaf-base of *Ynesa*, shown in figure 5, are only three or four feet long, but those of the opposite side of the leaf sheath, where an antiligule would be developed, may be much longer. The leaf base is longer in *Ynesa* than in the piassava palm and the leaf-base fibers may be more regular than those of the antiligule. As in other specialized characters, much variation may be found. Selection should be directed to differences in the fiber as well as to the characters of the inflorescences, fruits, nuts, and kernels, if the domestication of the palm were attempted. The fiber may be only a by-product or might prove more remunerative than the oil, and would be obtainable from the young palms before the fruiting stage. Harvesting the leaves for fiber might facilitate the harvesting of the fruits. The fibers of the peduncle, the axis and the branches of the fruit clusters may also be utilized as by-products.

THE ENDOCARP A THREE-FOLD STRUCTURE

A new structural element was indicated in describing the endocarps of *Borhoa* and *Ethnora*, a core or matrix forming the center of the nut, the partitions between the carpels, and the sutural bands, which in many of the cocoid palms are marked distinctly on the surface of the shell. The matrix may be considered morphologically as a placenta, an axial organ, a modified metamer, or an intercarpellary specialization of the compound endocarp. In many members of the *Attalea* series the matrix is more or less definitely outlined in cross-sections by rows of longitudinal canals along the radiating



Fig. 5. Ynesa palm, fruits and fruiting branches, natural size

flanges that separate the chambers of the nut, where two or more carpels are fertile. The relation of the matrix to the sutural bands was first recognized in describing the endocarp of *Ethnora*.

The sutural bands of *Ynesa*, less distinct than those of *Ethnora* and *Bornoa*, are marked on the surface of the nut by only a slight striation, and in the cross-section by a few fibers forming a triangle. At the apex of the nut the sutural bands become prominent but are completely fused with the carpels, forming a conic rostrum about 5 mm. long. The rostrum terminates in three tubercles surrounding a central depression with the underlying tissue not indurated, as shown in one of the longitudinal sections of a nut in figure 5.

A third element of the endocarp, wanting in *Ynesa* and related genera, but highly developed in *Attalea*, *Orbignya* and *Scheelea*, is an outer shell apparently formed from a layer of mesocarp fibers, indurated and fused with the inner endocarp and the sutural bands. This fibrous reinforcement often is much thicker than the uniform layer underneath, which doubtless represents the true endocarp. The nuts of some of the species of *Attalea* and *Orbignya* have shells 6 to 10 mm. thick, with only one or two millimeters of uniform tissue near the chamber wall. Even in small-fruited members of the *Attalea* series, the preponderance of the outer fibrous sheath over the uniform inner layer usually is maintained. An exception appears in the "palma real" of Colombia, described by Karsten in 1856 as *Scheelea regia*, which may be considered as the type of that genus. The nuts are small like *Ynesa*, and the shells of nearly the same thickness, but less than half of the shell showing fibers in the cross-section. The Brazilian genus *Pindarea*, with rather small thin-shelled

nuts and superficial foramina, may prove related to *Ynesa*.

The great thickness of the true endocarp in the nut of the piassava palm, attaining 10 to 15 mm., is a marked feature of the new genus *Sarinia*. An approach may be seen in *Ethnora*, with the endocarp about twice as thick as in *Ynesa*, *Bornoa* and *Temenia*, but *Ethnora* has superficial foramina while those of *Sarinia* are on the inner face of a deep cavity. The embryo of *Ethnora* projects from the endosperm into the canal leading to the foramina, while the embryo of *Sarinia* is not prominent. The shells of *Sarinia* often split along the grooves, where the flanges of the matrix are near the surface, as though the matrix tissue were more friable. The canals of the matrix of *Sarinia* are somewhat scattered through the tissue, rather than forming peripheral lines as in *Ethnora*.

PROBLEMS IN THE STUDY OF PALMS

Palms admittedly are a difficult group for making herbarium specimens, and have received less study on that account, but plants of many other families have structural features that are not reducible to the herbarium compass of two dimensions, and are disregarded through this limitation of herbarium methods. The "gross anatomy" of plants, the "vegetative characters," are in special need of being studied, described and contrasted, so that the different forms and habits of different types of plant life can be recognized in nature or in cultivation, such recognition being the first requirement for further study. Only by taking account of the external, visible features of plant life can the study of botany attain its proper place among our normal interests and satisfactions.

It is hardly too much to say that the Linnaean "sexual" system of classify-

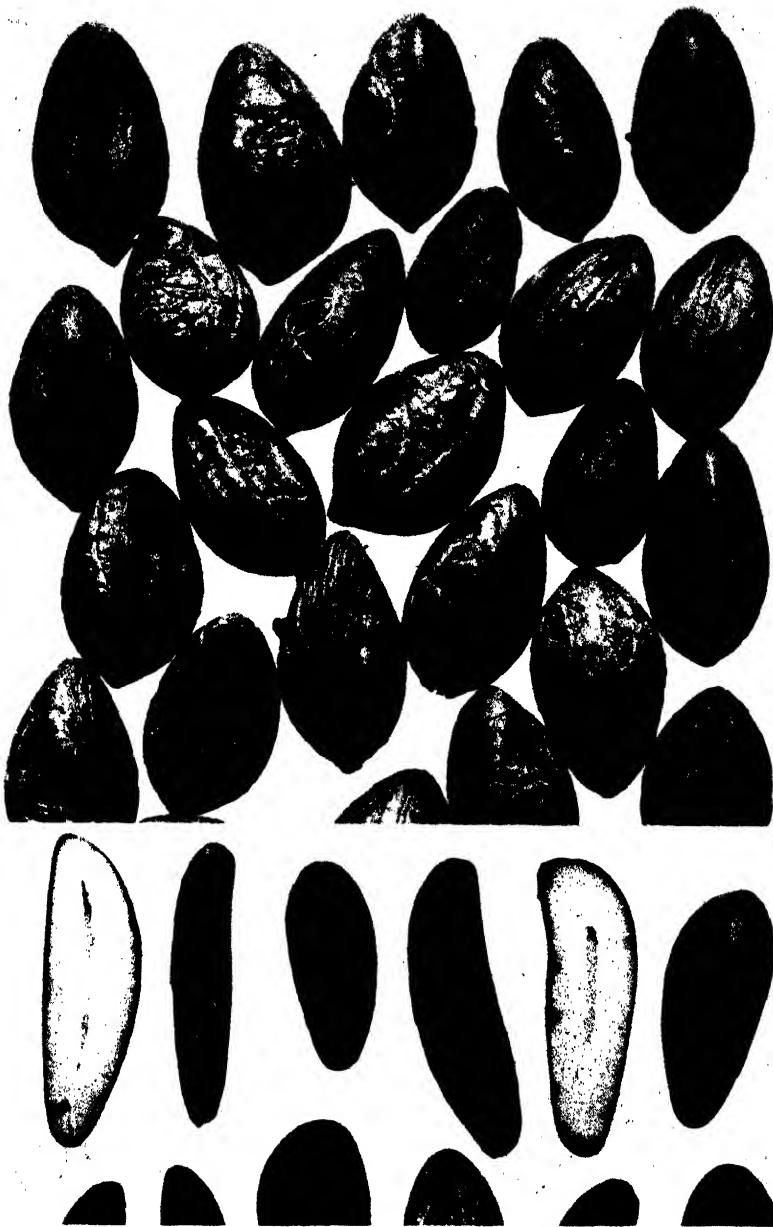


Fig. 6. Ynesa kernels from Ecuador and babassu kernels from Brazil, natural size

ing plants, by focusing attention so exclusively upon details of floral structure, often minute, temporary and difficult to interpret, has tended to narrow the range of public interest and to limit the study of botany to those working professionally with herbarium collections. The curatorial function is important, but an exclusive relation to the study of plants should not be assumed, lest our natural interest in the plant world be aborted and pushed aside. Botany often is reflected in general literature, not as the science of plant life, but as a rather trivial art of "naming flowers." A philosopher like Santayana, with a wide outlook over human interests, dismisses the botanist as "only a professor."

The state of knowledge and interest in extra-floral specializations was tested thirty years ago in describing a series of remarkably contrasted habits of branching in several well-known plants that receive intensive study in many countries. A paper was published in 1911 as a Bulletin of the Bureau of Plant Industry, No. 198, under a sufficiently explicit title, "Dimorphic Branches of Tropical Crop Plants: Cotton, Coffee, Cacao, the Central American Rubber Tree, and the Banana." The experience of discovering these specialized habits of growth and demonstrating various applications to cultural and breeding problems has made it plain that little approach to this aspect of plant life is provided in current text-books and courses of training.

With no thought of depreciating the interest or significance of the floral specialization, it may still be asserted that the vegetative specializations are not less interesting or important in plant evolution or in plant utilization. That a palm should reduce its annual crop to a single inflorescence, as appears to be the case with *Ynesa*, instead of the

several inflorescences usually produced in related genera, is not less remarkable than that some of the stamens or petals should be modified. The inflorescences of palms often are more specialized than the flowers, and in other cases the leaves, the trunks, the seedlings or the seeds present significant differences. All of these features are much more accessible to observation than the flowers, which may be limited to a week, or even a day. Instead of wider interest and broader methods of botanical work being planned, further limitations are projected, as though plants were to be named without being studied, except to the minimum of assigning conventional floral characters.

This is the tendency of rules proposing to restrict the naming of plants to herbarium specialists, and to a limited class of such specialists, those proficient or reckless in writing Latin descriptions of plants, according to the medieval customs still followed in some of the European countries. The requirement of Latin diagnoses would place botany on a different footing from other biological literature, and create many needless difficulties, since in any English description of a plant most of the contrasting differences are stated in Latin or Greek words, which the English language readily incorporates. The diagnostic characters of *Ynesa*, for example, the elongate inflorescence, rostrate endocarps and excavate foramina, are scarcely different in Latin: *inflorescentia elongata, endocarpia rostrata, foramina excavata*. The genus *Sarinia* is characterized as clearly by long fibers, interrupted pinnae and uniform endocarps as by *fibris longis, pinnis interruptis, endocarpiis uniformibus*.

No practical or scientific reason has been shown for placing a handicap on the study of plants in English-speaking countries where the classical languages

are giving way to the plea of making education more scientific. Even for would-be botanists Latin without Greek offers limited advantage. Latin botany began with translations of Theophrastus and Dioscorides, and the borrowing of scientific terminology from the Greek language has continued through the centuries, in English as in Latin. Any Latinist who knows botanical terminology can read plant descriptions in English. Technical botany is not classical Latin or classical English, but a special jargon, not to be venerated, but rather to be escaped. Making botany more esoteric is not a scientific object, nor an aid to human progress. The demand that science become more widely intelligible is being urged for reasons of national welfare. "For the public must, first of all, be informed about science if research is to be preserved."

An enforced linguistic uniformity must remain a dubious project, with patriotic people often impelled to describe their native plants in their native language, regardless of foreign experts. A zeal for formal regulation of botanical literature might be exercised more constructively by providing that new types of plants be made known through adequate illustrations, which can be interpreted in any language. The art of photography makes it possible to have natural-size reproductions of essential features for direct comparison, like actual specimens. A single illustration showing details of a new type, like the branches and fruits of *Ynesa* in figure 5, permits a definite recognition of the palm, which elaborate descriptions may fail to accomplish. The notion of botany being based primarily on definitions has made it a sterile "study." All of the study is futile that does not deal with visual impressions. The eye

is the primary organ, not the faculty of logical formulation.

The further development of systematic botany needs to be studied from the standpoint of education. The system of classification of plants and animals is the greatest structure of thought that the human mind has erected, but left in a state of forbidding technicality. No other system in science, philosophy or law deals with such an endless array of forms and concepts, organized by so many constructive intellects. Botany is a field of unlimited interest for "the independent activity of the human mind," but some would have it closed and barred. "All literature has its conventions," and botany is intensively formalized.

The diversity of living forms is a basic fact that the public intelligence must assimilate, if our system of civilization is to reach a truly constructive consciousness. A world of one kind of plants is unreasonable, or a world of one kind of people. The notion of human welfare as a state of uniformity is one of the statistical delusions that attend the exploitive dominance of the physical sciences in our present world, and are plainly destructive. Many moralizing expedients of controls or leaderships are being contrived by benevolent specialists without appreciating that nations of scientific people are needed to appreciate and apply science. Only by way of interest in the plant world is it possible to project the rural renaissance which obviously is necessary if our system of civilization is to be maintained. It is not enough that herbarium collections be supported, or public gardens; our primitive birthright of interest in living forms must be recovered and developed.

About Lilies

VIOLET NILES WALKER

SUCCESS with the scale bulb lily depends primarily upon some understanding and analysis of its history, for no other plant family has experienced such definite extremes of popularity and neglect, with corresponding fluctuations in cultural theories. And with no other flower has successful cultivation depended so vitally on knowledge of certain of its habits.

Even the most casual comparison of notes published between 1870 and 1910, with those of the past twenty years, emphasizes the astonishing distance that has been travelled in the knowledge of this great family and, moreover, leads one to wonder, not why the lily has been so long coming into its own, but how it has ever survived the misguided attentions showered on it in the past.

Curiously enough, there have been since 1800 three sharply defined periods of lily's rise and fall in popularity, traceable in each case to the introduction of a certain variety.

Up to 1800 there had been a dozen species in common use in English gardens, all of which were mentioned by Parkinson as early as 1600. In 1804 *I. tigrinum* was brought to England from Japan. Its remarkable constitution, the rapidity of its increase, and its indifference to exacting soils and climates caused a great awakening of interest both in growing lilies more generally and in exploration for plants in foreign countries. With the finding of new species this interest increased steadily, reaching its climax when in 1862 the discovery of *I. auratum* in Japan created a furor.

The plant world literally went wild

over this lily, and for a number of years thousands of bulbs were shipped annually by the Japanese. Unlike the Tiger Lily, however, *I. auratum* soon proved itself untamable, and the inability to keep it for more than one or two years at most finally caused a sharp reaction in popular sentiment—a reaction which ended beyond the offending member and caused a wide unpopularity for the lily family in general so that only a comparatively devoted few continued to grow liliiums and to study the new varieties which, by this time, were arriving in large numbers.

But in 1904 *I. regale* was discovered in a remote mountain valley in China by Ernest H. Wilson. The great beauty of this lily, its hardiness and ease of culture, its immunity to the mysterious diseases that were at that time little understood, soon placed it in a unique position among garden flowers. It became literally the queen of the garden and, most of all, it revived the almost defunct interest in scale-bulb lilies.

A fresh interest was given to scientific study of lily culture, and united investigations of plant pathologists and devoted amateurs revolutionized the knowledge of lily habits and needs, cultural methods and diseases. Early accepted theories have been reversed, and the unique make-up of the lily, which so materially influences its behavior under cultivation, is now recognized and more thoroughly understood. Why this new knowledge should materially affect the question of soils and fertilizers is a just question, but even the briefest glance at the situation will quickly answer it.

It was many years before the garden-

ing world realized the fundamental characteristics of the lily. The differences in bulb habits and root systems of various species were not understood, still less the important part played by the roots. As the new varieties appeared and showed widely differing characteristics, which apparently defied attempts at control, the greater attention of lily growers was centered on simulating the soil and home conditions of the new arrivals—a difficult and complicated undertaking as may be imagined, considering their widely differing habitats, and one which did not produce the expected results.

It was not until the new introductions were more widely grown from seeds that more intensive study could be made of their habits, and from then the discoveries made were revolutionary, so that in an incredibly short period lily growing took on a new aspect, with fewer complications and less pampering.

Take for example, the root systems of the lily. It is known, now, that with many varieties the roots are slow in developing and probably never rest; that some species have much longer roots than others; while the value is realized of the contractile roots which are part of the make-up of so many lilies, and which operate to pull the bulb to the depth needed for an adequate moisture supply: that damage to the roots threatens the life of the bulb, especially with the bulb rooting varieties: while the tangled masses of stem roots on the stem rooting varieties not only provide needed nourishment but, in case of damage to the parent bulb may be a dependance for continuing the life of the lily.

Indeed, what we have learned is a far cry from an amazing theory published in 1878 in the English "Garden" con-

cerning the stem roots of lilies, which says: "A fruitful source of injury to the successional bulbs is the stem roots, which some actually encourage by top-dressing and heaping up the soils around the lower part of the stem. These stem roots are some of them of great length, they do down, and not only impoverish the soil, but they twine themselves in and out among the scales, suck out the sap, and destroy the bulbs for next season's bloom. Rose growers wage war against suckers coming up. Lily growers should wage war against suckers going down. Every now and then remove the soil for one or two inches and carefully *clip off every vestige of a stem root*, returning the soil again." (The italics are ours.)

In like manner, we have gone far in the knowledge of handling and planting bulbs. We know that the succulent starchy bulbs must not be damaged and cannot be long exposed to air; that they will not stand stagnant water (although demanding moisture) and we are learning the different depths at which various species need to be planted. For example, it is seldom that one meets, now-a-days, the old exploded directions as to planting the madonna develop, they stifle the growth of the parent bulb, though not, curious to say, killing it, and unlike the bulblets of such lily (*L. candidum*) 4 to 6 inches deep. It is well recognized that both *L. candidum* and its hybrid, *L. testaceum*, thrive best less than two inches below the surface of the ground. If planted deeper, they show their preference for surface growth by developing bulbs at the base of the stem, practically at the top of the ground. As these grow and develop, they stifle the growth of the parent bulb, though not, curious to say, killing it, and unlike the bulblets of such lilies as *sulphureum*, *Henryi*, *tigrinum*, or *longiflorum*, they do not pull them-

selves to lower depths by any contractile roots.

Again, the new theories as to soils and fertilizers today stand in the front rank of radical changes. In the past, as above mentioned, the aim of the lily enthusiast was to reproduce as closely as possible the natural habitats of the various species. Alkalinity or acidity were of paramount importance, insistence was placed on the lean diet the lily was accustomed to, and these assumed such proportions as to bewilder and discourage amateurs.

However, in the past decade dependable knowledge has been established, and instead of cluttered-up directions for preparing different soils and food for different groups of lilies, it has been found that the majority of varieties may be successfully grown together in a neutral soil, provided they are given the one universal need of free drainage. True, there are exceptions to this rule, but they are a small minority, and for the most part confined to those lilies classed as difficult even for the experienced grower. Indeed, we are told that out of 46 species now obtainable in commerce, only about a dozen belong to this still considered "difficult group." These are:

<i>Bolanderi</i>	<i>Leucanthum</i>
<i>Catesbaei</i>	<i>Parryi</i>
<i>Duchartrei</i>	<i>Parvum</i>
<i>Grayi</i>	<i>Philadelphicum</i>
<i>Humboldtii</i>	<i>Polyphyllum</i>
<i>Leichtlini</i>	<i>Washingtonianum</i>

The steps which have led to this and other discoveries have been brought to the public eye largely through the Lily Year Books of the English Royal Horticultural Society over the past eight years while recent publications such as "Lilies" by Woodcock and Coutts, and "Lilies for American Gardens," by George L. Slate, have summarized this

progress, and presented the findings to date in simple concise form. These steps cannot here be discussed at length, but only a brief summary shows the distance travelled in cultural procedures.

Take the question of drainage. Intensive study of lily roots, their functions and habits, has proved beyond question, that a deep root run, where adequate moisture is always available, is the chief demand of all lilies. There must be no stagnant water about its bulb, yet moisture must be supplied during periods of surface dryness. This means porosity of soil for heavy clay conditions and retention of moisture for light sandy soils.

This is not as contradictory as it seems, nor in any way difficult of accomplishment. In clay soils, having a sticky heavy sub-soil, digging out to a depth of three feet and incorporating a layer of broken stone or heavy cinders, together with leaf mould or other humus is the accepted practice. Above this a neutral soil, composed of a mixture of one part loam, one part sand and grit, and one part humus, will meet the needs of most lilies. Where a bulb inclines to the acid side, half humus and half peatmoss can be used.

A sandy soil should be given the opposite treatment, that is, building downward to a depth of at least three feet with a greater content of humus, to conserve the moisture which is otherwise apt to percolate too rapidly.

The presence of lime in the soil, though still a factor with some species is negligible with the following, especially if given liberal quantities of leaf mould:

Backhouse hybrids	<i>marhan</i>
<i>Brownii</i>	<i>leucanthum</i> , var.
<i>aurantiacum</i>	<i>chloreaster</i>
(or <i>croceum</i>)	<i>pardalinum</i>

<i>bulbiferum</i>	<i>Parryi</i>
<i>callosum</i>	<i>pyrenaicum</i>
<i>cernuum</i>	<i>regale</i>
<i>Davidii</i>	<i>umbellatum</i>
<i>Hansonii</i>	varieties
<i>longiflorum</i>	

Lilies that will stand more lime (though not insisting on it) are:

<i>amabile</i>	<i>Henryi</i>
<i>candidum</i>	<i>martagon</i>
<i>carniolicum</i>	<i>monadelphum</i>
<i>concolor</i>	and varieties
<i>darmottiae</i>	<i>pomponium</i>
<i>chalconicum</i>	<i>testaceum</i>

Lilies that give best results in almost pure leaf mould, that is, three parts leaf mould, one part loam and one part sandy grit are:

<i>Horsfordii</i>	<i>medeoloides</i>
<i>Hansonii</i>	<i>neilgherrense</i>
<i>Bakerianum</i>	<i>nepalense</i>
<i>Wallichianum</i>	<i>japonicum</i>
<i>Leichtlini</i> (var.	<i>rubellum</i>
<i>Maximowiczii</i>)	<i>superbum</i>

The first steps in clearing up the acidity-alkalinity question came when it was found that seedlings of both acid and lime loving varieties flourished together in the same soil. Experiments and tests, pushed further, developed the fact that acid-loving lilies, planted in location, continued to thrive long after the acidity had leached out, and in a very few years the possibility of using a general soil mixture where extremes meet, and the majority of lilies can be grown together, became reliably established.

With fertilizers, too, there have come radical changes. In the last century, after studying the home sources of Asiatic lilies, a lean diet was considered essential to success, but modern widespread experiments have shown that lilies, with a few exceptions are great feeders, and can assimilate enormous

quantities of the proper food. This knowledge, however, has only been acquired fairly recently, so it cannot yet be definitely stated how the longevity of the plant is affected through heavy feeding.

The foods most acceptable to the lily are:

1. Phosphate, for nourishing the bulb, the most easily obtainable form being bone meal, applied to the surface and forked in.

2. Potash (for developing size and color of blooms) in the shape of wood ashes, worked in liberally when the lilies are half grown.

3. Manures, barnyard and stable, thoroughly spent and becoming what we call humus. These can be liberally dug in six inches below the bulb, and used also as a summer mulch, but must never touch the bulb.

4. Compost, as ordinarily made from vegetation and lime, used the same as spent manures.

5. Soot, mixed generously with material used as summer mulch, or with weak liquid manure, deepens and brightens the color of both leaves and blooms.

6. And probably the best for lilies, is leaf-mould, produced from decayed leaves of oaks, or from woodland growth. This should be from one to two years old, and is improved by using some grit or sand with it.

So for the amateur, possibly the most comforting of all discoveries is the fact that soil is not the controlling factor. Moreover, it takes but slight personal experience with only a few varieties to realize that the lily on the whole is not a wayward plant, and while it is subject to attack from certain diseases, as are any other garden favorites, modern science is working on the solution of these with the same skill and deter-

mined efforts as are given to the diseases of iris, delphiniums, roses, etc. Enormous strides have been made in the investigations of conditions, so long unknown, which have threatened the longevity of the lily. The causes and effects of Botrytis and Mosaic, its chief enemies, are being given a wide publicity, and scientific study of control measures is already showing astonishing results.

All of this is opening up a new avenue of approach to successful lily growing and even the least experienced amateur can look for a large percent of success if the chief demands of the lily are borne in mind, which are: 1st, that it be given good drainage. 2nd, that it have the same reasonable protection from pests and diseases that is given the rest of the garden. 3rd, that once properly planted it be left alone.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

CHOICE DROUGHT RESISTANT ROCK PLANTS

The following choice rock plants were planted in the autumn of 1939 and they have survived without much trouble the past two winters and summers and especially the drought of the last year. They were planted in a well-built rock garden amongst fairly large rocks, which are submerged for at least half in the ground. The soil is shaly clay, well drained and into which about one-half inch in thickness of leafmold has been incorporated. The whole rock garden is covered with about half an inch of limestone chips. The chips are spread evenly to the crown of the plants.

Actinea herbacea (Lakeside Daisy). This is a lovely native plant with glistening large yellow daisies in early spring on 8-10 inch stems making an attractive display for at least three to four weeks. It must be grown in full sun in well-drained and rather light soil.

Aethionema Warley Rose (New Persian Candytuft). This is a charming little plant with brilliant rose colored flowers in May and early June. It is of

compact low-growth, four inches high, and attractive blue-green foliage, which remains evergreen the year around. The blooming stems should be cut off just as soon as it has finished blooming. Plant it in well drained soil in full sun.

Arabis Ferdinand-Coburgi. This is a most distinctive Rock Cress with dark evergreen foliage and remains attractive throughout the year. It spreads nicely but not too rapidly, forming low tidy mats that very seldom show any dead or burned spots in the center of the plant, as is so often the case with varieties of *Arabis albida* or *A. alpina*. The white flowers appear on four inch stems in early Spring and flourish well in sun and part shade.

Armeria Caespitosa Hybrids. These are very free bloomers in mostly bright pink shades and attractive during the month of May. Their wiry stems are four to six inches high with evergreen foliage.

Campanula carpatica Purple Carpet or Blue Carpet. This is a fine form having masses of lovely cup-shaped purple-blue flowers nearly all summer on low compact plants only six inches high. While it will do best in full sun,

it will also do fairly well in part shade.

Coronilla cappadocica. This is an old time favorite in England, and if you are looking for a blaze of gold in late May and June this will furnish it. It is trailing in growth and easily grown in full sun.

Dianthus Bobby. This compact growing pink blooms freely in late May and June, with a few scattered blooms off and on during the Summer and Fall. The color is a pleasing shade of rather deep pink or rose, with a crimson ring toward the center of the blooms. It is eight inches in height and thrives easily in well drained soil in full sun.

Geranium sanguineum var. *lancastriense*. This is one of the best and most beautiful hardy Geraniums. The delicate light salmon-pink blooms appear off and on all summer. It is trailing in habit and the blooming stems are seldom more than four inches high, and it grows very easily in sun and in part shade, and furthermore survives the drought.

Geranium argenteum. Although here it does not make much of a show when in bloom, its gorgeous and distinctive silvery foliage makes up for what it lacks in blooming qualities. This is indeed a choice plant and must be planted in a well prepared pocket, made well drained by working deeply in the soil a few limestone chips. It grows best in full sun.

Phlox subulata Camla alba. This is a very outstanding new Phlox, having all the good features of the already popular pink P. Camla but being easier to grow and much more compact in habit of growth. If planted in the full sun it blooms very freely in the spring and again a fair amount of bloom in the fall.

Silene alpestris fl. pl. If I had but one choice of a white rock plant, this most assuredly would be my choice.

It blooms very freely in June, with a fairly good show of scattered blossoms throughout the season. The flowers are fully double, about one-half inches in diameter, coming on branched sprays eight inches high, and it is best grown in full sun.

Tunica saxifraga fl. pl. This is an old favorite of white and pink blossoms and always dependable, the bloom persisting all summer and well into the fall. The lovely small double flowers resemble somewhat those of the double Gypsophila or Baby's Breath. Although best grown in full sun, they will get along nicely in part shade.

P. DONOFRIO

Westminster, Maryland

Dryas sundermanni

Over a period of years I have had as much pleasure from this prostrate shrub as from any plant in my collection. The stock originally came from the Pacific Coast, and about the same time I collected *Dryas octopetala* in Quebec. Since then I have had the latter and another species as well from several sources, but have not been successful in keeping them. Miss Alice Kauser assured me that I would find this to be the case but that *D. sundermanni* was of easier culture. She went on to say that she knew Sundermann personally, and talked entertainingly of him and his collection of rare mountain plants.

The original plant of *D. sundermanni* grew well enough here, and after being sure that we could cultivate it readily we set out to increase it. Cuttings in the usual manner rooted rapidly and layers also developed roots. But when these were potted and given good culture under glass they promptly died. After several tries, we solved that difficulty by planting them outside at once,

from the cutting bench, into a shaded frame—from which we developed the present technique, which is to pot when rooted, hold under glass for about a week and then plant directly into the open field bed. And at the same time we kept moving the open field beds into drier and drier locations, until now we have them in full exposure in a very light dry loam, on which water never stands. In the average winter we lose some plants, but always from snow freezing down through the straw covering and remaining as water in the spring, which rots the stems. The original plant, now some four feet one way by two the other, was badly killed out this spring in a dry and partly shaded location, but at the edges life was lusty. It is perhaps necessary to lift and divide the plants from time to time or else the soil loses its fertility and woody stems may choke each other.

When happy, this plant is a perfect mat of foliage of a rusty brown, neat and clean looking, and not more than an inch or two off the ground, except as the stems mound one over the other. Above this, in June, are the yellowish buds, which always remind me of those of the little yellow rose, George Elger, but which open to pure white flowers, single, and an inch and a half across. After the first burst of bloom there are scattered flowers all summer, and I am under the impression that the younger plants flower better, and also that if the feathery seed heads were not allowed to

form, there might be many more late summer flowers. However, I enjoy the seed heads almost as much as the blooms, so this has not been tried.

As for uses, any dry spot in a rockery would seem proper. I recall that *D. octopetala* carpeted a knoll, probably of thin soil over a small boulder beside the Laurentian trail where I took it. As we here are at about 100 feet elevation only, and our summers are hot and dry, there is no reason to think that the plant requires coddling much further south, though all *Dryas* are native to the north, or are found at considerable elevations. Certainly we have had better luck with extremely dry culture in full sun than under seemingly better conditions. Last of all, we recently made a wild garden, in which was a large ledge with the top nearly flat and containing a small hollow some five feet long, by a foot or less wide, and at the most not three inches deep. This was in an area of heavy snowfall at an elevation of some two thousand feet. Filled with soil from nearby woodland, mostly from under evergreens and quite mucky but sharp, this hollow was planted with a few *Dryas sundermanni*. They grew remarkably well, quickly covered the area and spread out onto the ledge, went through the first winter well, and have been persistent despite the very apparent dry location.

FRED M. ABBEY

Shelburne, Vermont

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

NOTES ON RHODODENDRON SPECIES AT THE BOTANICAL GARDEN, UNIVERSITY OF CALIFORNIA—PART 2

Barbatum Series: The majority of the twenty-six species contained in this group would be considered hardy in climates similar in moisture and temperature to the Pacific Coast from Monterey Bay to the southern part of British Columbia. Their nearest relatives are found in the *Arboreum Series* and the chief distinguishing feature is the character of the foliage, which in the *Barbatums* is usually covered with long glandular bristles. They require high shade and protection from prevailing winds, and, since one of their desirable characters is the attractive foliage, they should be kept in good growing condition by planting in a leafy soil where they can receive an abundance of moisture, both overhead and at the roots, during the growing period and summer months. We have not had a chance to appreciate the value of such species as *R. barbatum*, *R. crinigerum*, *R. habrotrichum*, etc., because our seedlings are as yet quite small. However, the Burmese species, *R. glischroides*, has bloomed in March for three consecutive years and, while it is not to be compared to the more popular species in size or brilliance, it has a very definite charm of its own. It should eventually become a fair sized shrub, perhaps 15 feet in height, but to date our specimen has only attained a height of 4 feet with a corresponding increase in width. It is compact in habit and branches well from the base. The medium sized lanceolate leaves are rough to the touch and have numerous

bristles particularly on the margins, midribs, and petioles. The flowers are cup shaped, borne in loose brusses of from 6 to 10 blossoms which are cream with a purplish crimson blotch at the base of each petal. The young growths appear shortly after the flowers to further enhance the plant with their bright red stems and distinctive bristles. We hesitate to admit that our only plant *R. strigillosum* has not survived, especially since it was a seedling from an excellent form at the Royal Botanic Garden, Edinburgh, where the writer was privileged to see an 8-foot specimen of this species one March, a day or so before a late spring frost marred the many loose trusses of blood red tubular flowers. Those of us fortunate enough to be on the Coast need not take such late spring frosts into consideration, so that, given a sufficiency of water on the foliage and the roots during our rainless months, *R. strigillosum* ought to be the equal of many of the existing hybrids as a garden plant.

Boothii Series: With the possible exception of *R. auritum* and some forms of *R. aurcum*, species in this series are dwarf in habit and best suited for the shaded rock garden or similar location where they can be seen to best advantage. We have grown six of the sixteen species belonging in this Series and found them perfectly hardy in the San Francisco Bay Region. Judging from other growers' results, they have proven hardy as far north as Seattle, Washington. They have an affinity with the *Glaucum Series* which suggests to the hybridist that a combina-

tion of the hardier *Glaucums* such as *R. pemakoense* or *R. tsangpoense* with the less hardy yellow flowered *R. aureum*, *R. chrysodoron*, or *R. sulfureum*, might result in an interesting race of dwarf types. Such a race would be doubly valuable if the yellow flower character was retained.

R. deleiense (Boothii Series): A more recently introduced species collected for the first time about twelve years ago by Captain Kingdon Ward. We have yet to bloom *R. deleiense*, but specimens seen at Edinburgh were about 2 feet high and gave indications of becoming small foreground shrubs suitable for either the sheltered rock garden or semi-shady border. It is reminiscent of *R. tephropeplum* with large oblong, dark green, leaves and loose trusses of deep rose pink open campanulate flowers. It is considered hardier than its better known relative and perhaps easier of cultivation. We are indebted to Mr. David Wilkie, Assistant Curator, Royal Botanic Garden, Edinburgh, for the accompanying photograph.

R. leucaspis (Boothii Series): The foliage characters of this species induced Kingdon Ward to collect seed in spite of the fact that flowers were not in evidence. This "hunch" has subsequently proven to be a good one, since we now have an excellent dwarf Rhododendron to enrich our rock gardens. *R. leucaspis* ultimately becomes a low shrub, relatively slow growing, but flowering at an early age, thereby providing a valuable acquisition for the Alpinist who prefers to flower his plants in pans. The greyish green elliptic leaves $1\frac{1}{4}$ inches to 2 inches long, $\frac{2}{3}$ inch to 1 inch wide, are markedly pilose in the seedling stage. The flowers, which appear while the plant is still a few inches high, are salver milky white and about 2 inches in diameter. It is seen at its best in the shel-

tered rock garden, but may require protection in colder localities since the flowers usually appear in late February and early March. This species strikes readily from half-ripe cuttings taken in June or July when inserted in equal parts peat and sand in closed frame.

R. tephropeplum (Boothii Series): An erect growing under-shrub with twiggy stems first discovered in 1920 by Reginald Farrer, but introduced to gardens at a later date by George Forrest. In many ways a counterpart of *R. deleiense*, but until we have had sufficient experience with that species, we hesitate to state which is the more desirable. *R. tephropeplum* is certainly floriferous, every growth producing terminal inflorescences of bell shaped flowers. There are several forms in cultivation varying in color from magenta to almost pure white. Our plants have flowers of a delicate rose pink, appearing in late April, and provide a delightful contrast against the dark grey green leaves when placed in groups at the front of a shady border or at the turn of a path. Easy from seed, relatively easy from cuttings, and certainly worthwhile, especially in smaller gardens.

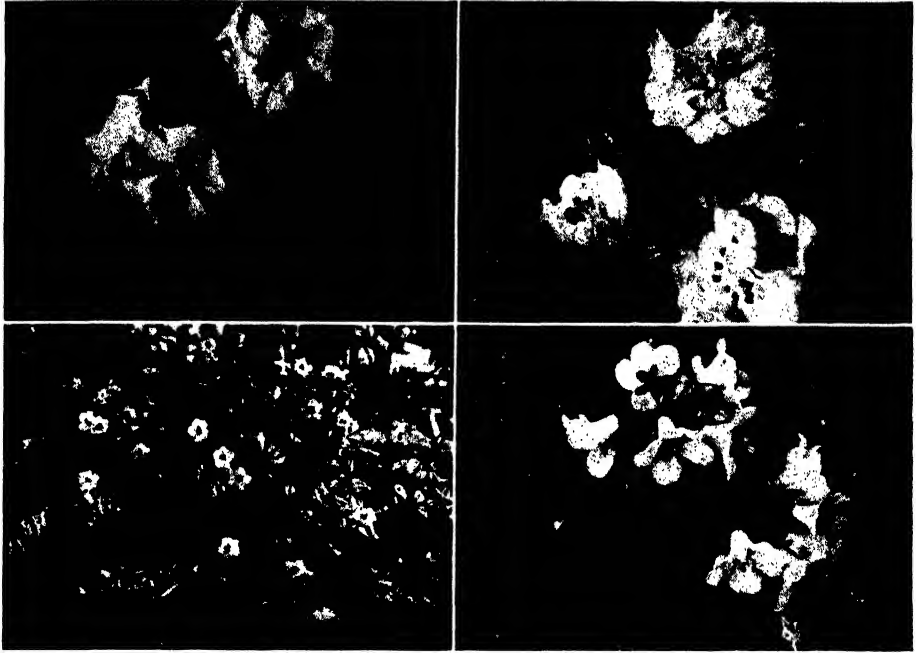
Camelliaeflorum Series: This Series contains only two species, both of which are of no importance to the gardener. *R. lucidum* is probably not in cultivation, and *R. camelliaeflorum* has no good point to recommend its use as an ornamental. The specific name suggests that it resembles the Camellia in flower, but we can assure you that the resemblance is purely botanical.

P. H. BRYDON

(To be continued)

ON THE BEHAVIOR OF RHODODENDRON SPECIES AND HYBRIDS IN VIRGINIA

"At Washington, D. C., and southward, a region is reached where the unfavorable influence of hot, dry weath-



(Upper) *Rhododendron leucaspis*
 (Lower) *R. leucaspis*; *R. delciensis*

er in summer makes itself felt. Here rhododendrons are none too happy, but may be grown well if a little attention is paid to their needs, especially the provisions for shade and irrigation. Since relatively little rhododendron growing is carried on in this district, it is somewhat difficult to determine which varieties are best adapted."

Since the above was published in 1935 (*Rhododendrons and Azaleas*, Bowers) some light possibly has been shed upon the matter of suitable varieties for the region south of the Potomac by the behavior of rhododendrons in my garden at Lynchburg, Va. The station of the U. S. Weather Bureau at Lynchburg has been in existence for seventy years and has complete records for that periods of time. Careful examination of them shows that the summer of 1941 was, with the possible

exception of the summer of 1933, the hottest and driest experienced in seven decades.

It would seem safe therefore to assume that any variety of rhododendron which passed through the summer of 1941 at Lynchburg with no apparent injury is a variety suitable to the region south of the Potomac, insofar as the hot, dry summers are concerned. Following is a list of the varieties, both hybrid and species, which when the 1941 summer drought had ended in October—it extended till then—were thriving:

Hybrids:

Album Elegans
 Alexander Adie
 Alice
 America
 Amphion
 B. de Bruin

Boule de Neige
 Blandyanum
 Britannia
 Caractacus
 Catawbiense album
 Catawbiense grandiflorum
 Charles Dickens
 Countess of Athlone
 Cunningham's White
 Cynthia
 Doncaster
 Dr. H. J. Lovink
 Dr. V. H. Rutgers
 Dr. H. C. Dresselhuys
 Duchess of Edinburg
 Edward S. Rand
 Everestianum
 Fastuosum flore pleno
 F. L. Ames
 Fred Waterer
 General Grant
 Gloire de Boskoop
 Goldsworth Yellow
 Gomer Waterer
 H. H. Hunnewell
 Horsham
 Hugh Koster
 Ignatius Sargent
 John Walter
 John Waterer
 Kettledrum
 Lady Armstrong
 Lady Clermont
 Lady Grey Egerton
 Lee's Dark Purple
 Loder's White
 Madam Carvalho
 Madam de Bruin
 Marchioness of Lansdowne
 Monsieur Thiers
 Mrs. Chas. S. Sargent
 Mrs. E. C. Stirling
 Mrs. J. H. Van Nes
 Mrs. P. den Ouden
 Mrs. R. S. Holford
 Nova Zambla
 Old Port
 Parson's Grandiflorum

Philippe de Vilmorin
 Pink Pearl
 President Lincoln
 Purple Splendour
 Purpureum Elegans
 Rosa Mundi
 Roseum Elegans
 Sappho
 Stanley Davies
 Smithii Aureum
 Sultana
 Van der Brocke
 Van der Hoop
 Van Weerden Poelman

Species:

R. ambiguum
barbatum
camphylocarpum
carolinianum
catawbiense
Chapmanii
dauricum
decorum
Degronianum
discolor
Fortunei
maximum
minus
mucronulatum
Yunnanense

A list of the varieties which failed to survive the summer of 1941 in my garden would likely be misleading because at the height of the drought the area where the plants were was infested with moles and pine mice, and in most cases it was impossible to tell whether death of the plant was due to the hot dry weather or to root disturbance caused by the moles and mice or to a combination of the two. Two or three plants that died gave no indication of having been disturbed by the rodents.

In considering the above list it should further be borne in mind that not all the varieties have proved themselves

winter-hardy in Virginia (*Smithi aureum* and Loder's white are two such), but any variety in the above list known to be winter-hardy north of Washington, D. C., might, I think, be considered year around hardy in Virginia. Indeed

those varieties which best withstand the dessicating effects of low temperature seem best to stand the drying effects of hot dry weather too.

POWELL GLASS

Lynchburg, Virginia

A Book or Two

The Tomato. Paul Work. The Orange Judd Publishing Co., Inc. New York, 1942. 135 pages, illustrated. \$1.25.

At this time when vegetable growing is of such special interest to all gardeners and the tomato plays such an essential role in world dietary, the appearance of this compact and readable volume is particularly welcome. It is a practical handbook written for the amateur from a background of expert professional knowledge and experience. While it is not addressed essentially to the amateur, it is the sort of book in which the amateur will find not only what he himself wants for his smaller activity, but the program that concerns professional production.

Asparagus Production. Homer C. Thompson. The Orange Judd Publishing Co., Inc. New York, 1942. 124 pages, illustrated. \$1.25.

Like the volume on the tomato, this has been prepared by an expert for the amateur but with full attention to the commercial grower.

Although one might recall that asparagus is not a plant for immediate return, under present conditions when many are considering a program of vegetable production for the future, this is an important contribution for all who can include this excellent vegetable in their schedule and garden activities.

Gardens for Victory. Jean-Marie Putnam and Lloyd C. Cosper. Harcourt Brace & Co., New York, 1942. 220 pages, illustrated. \$2.50.

"A little book to help your garden, however modest, produce continuous supplies of nutritious food, properly selected, on the smallest space in the shortest time, for the least cost"; so runs the opening inscription.

Another timely book. This covers the entire field for the home gardener, and with more attention to geographical and regional practices than most.

Clean, simple, well documented, it should appeal to almost every sort of gardener. The illustrations, which are diagrammatic, will also help in every phase.

Vegetables in the Garden and Their Legends. Vernon Quinn. J. B. Lippincott Co., Philadelphia, 1942. 261 pages, illustrated, \$2.50.

Any reviewer of Mrs. Quinn's is always of two minds—shall he abandon himself to the pleasure of her text or shall he force himself to verify her adventure. If he is a comfortable person he always follows the first path. This is the course the reader may well follow.

The illustrations or decorations of this book are by Miss Louise Mansfield—less medieval than those of Marie Lawson in former volumes, but no less fine and much nearer the plants.

Plant Hunters in the Andes. T. Harper Goodspeed. Farrar & Rhinehart, Inc., New York, 1941. 429 pages, illustrated. \$5.00

The Latin American countries are much in our minds and thoughts these days, and for those of us who really care about the development of a mutual knowledge, this volume is welcome. It is easy reading—full of technical names that do not overcharge the text with difficulties; full of quotations, not only from the past but from all the pictures taken by many cameras. In spite of this it remains Goodspeedian, to coin an adjective in the Spanish fashion.

Possibly the most important thing in the book is the evidence that there are untold riches in our neighboring countries for us to learn and to seek out, not merely to "exploit," and that from it all can come, an amazing unfolding of the spirit that should be our chief end in life.

Our Shade Trees. Ephraim Porter Felt. Orange Judd Publishing Co., Inc., New York, 1942. 316 pages, illustrated. \$2.00.

This is a "revised and enlarged" edition of Dr. Felt's former volume, which has been invaluable for years. One hesitates always to use such a word as complete and yet one is tempted to use that word here, knowing full well that whatever new and important matter the future will hold will be gathered into any new edition, just as very valuable chapters have been added to this, particularly those relating to a storm damage.

It may be pointed out that although many tree species are mentioned, the book is not planned about a choice of species or kinds but rather about the fundamentals of tree life and the care that they should have from man.

Propagation of Plants. M. G. Kains and L. M. McQuesten. Orange Judd Publishing Co., Inc., New York, 1942. 639 pages, illustrated. \$3.50.

This is a reference book—a revision of a book of long years' service, bringing into the original text the rich harvest of knowledge that has come during that time, particularly of late the current stream of scientific investigation has been turned on old practices, known but not understood, adding to them many very useful practices that could only have had their origin in the laboratory. There is a long and useful index, by which the reader can find his way with a minimum of difficulty.

Ornamental Shrubs and Woody Vines of the Pacific Coast. Evelyn Graham and Howard E. McMinn. Gillick Press, Berkeley, Calif., 1941. 259 pages, illustrated. \$3.00.

This is a difficult book to review in such a way that its merits will be as appealing as they deserve. It is, of course, useful only on the Pacific Coast and perhaps will be more useful in California than elsewhere. It is technical in its approach and treatment but not so technical that the good horticultural amateur should hesitate to use it. There are many illustrations, line drawings, halftones, color plates.

Lilacs for America. John C. Wister, Chairman and Editor. Published for the Association by Arthur Hoyt Scott Horticultural Foundation, Swarthmore College, Swarthmore, Pa. 64 pages.

A very useful reference work which represents the tabulation and organization of a vast amount of historical data in such form that all workers hereafter must start with this report. Not recommended for lively reading but invaluable.

A Southern Garden. Elizabeth Lawrence. The University of North Carolina Press, Chapel Hill, N. C., 1942. 241 pages. \$3.00.

There are occasions in which there is no more damning thing than to begin a review such as this by saying that the book is well written; here the reviewer will go farther and say that it is so well written that it puts many others to shame. Aside from a purely personal interest because of having seen some Raleigh gardens, the author's included, it makes no earthly difference to me what happens there in early March or mid-August, but reading this book is a pleasure that requires and sustains one's interest, piques one's curiosity, inflames one's imagination and breaks down one's resolutions. How much more could one ask? Our climates being what they are, this book may be useless as a guide of the recipe book style, but for the rest of you, read it for your own undoing!

The Picture Garden Book. Richard Pratt, with color photographs by Edward Steichen. Howell, Soskin, Publishers, New York, 1942. 143 pages. \$5.00.

If you are a reader of magazines rather than books you will have met much of this before, and if you are a clipper-scrapbook maker you will be only too pleased. It is not your reviewer's kind of book and he finds himself rather cornered in not knowing just what to say. Possibly the root of his distaste lies in the fact that the pictures seem too much like set pieces, and he suspects that if a guileless amateur were to attempt their reproduction, he would suffer all the agonies that are endured before the opening of an International Flower Show.

What anyone could find and can, if he will, is a sharpening of his eye to see color and form and texture, harmonies and contrasts—all of which are of value in garden life.

The Gardener's Pocketbook

Eriogonum sub-alpinum (Sulphur Eriogonum)

Flowers of the *Eriogonum* (woolly knees) genus do not aspire to petals but depend on calyx, or bracts, or both for their color. By this device they seem to keep their color longer than those flowers following the usual custom of having colored petals.

Eriogonum sub-alpinum retains its creamy yellow longer than its mountain neighbors of other genera, and when it does decide to rest it passes through a lovely rosy-orange-henna stage while waving farewell.

The flowers in a broadish umbrella, supported by a bare handle six to eight inches high, rise from a large flat mat

of leathery evergreen simple leaves, smooth on top, white woolly underneath.

Plants of this *eriogonum* are found on sunny dry mountain slopes, at their loveliest near timberline. They settle down comfortably in the garden on deep gravel with a little peat, but do not bloom till well established. The illustration shows a plant, probably several years old, growing at an elevation of 10,000 feet on Hoosier Pass in Colorado.

Tap root habit makes this resent transplanting. Propagation is comparatively easy by means of layers, cuttings, and seed.

KATHLEEN N. MARRIAGE
Colorado Springs, Colorado

Eriogonum ovalifolium

This little dwarf *Eriogonum* (False Buckwheat) is a charming rock plant. By the way, isn't it time we found better adjectives for plants than "dwarf" which hints at deformity, and "false" which is not complimentary?

The roundish silvery grey leaves of *Eriogonum ovalifolium* form a loose rosette, attractive at all times and especially winsome in winter. In May and early June many stems carrying pink buds shoot out horizontally from the center. These open slowly into soft yellow round heads which last a long time. Then, like in sister *E. subalpinum*, they change to a warm old-rose pink before they say a final farewell.

In dry plains regions of Colorado, Wyoming and Utah we find this species growing in sand, gravel, and in stiff clay. Evidently all it asks is moisture in spring and dryness after blooming.

Mature plants have untransplantable tap roots. Even young ones are difficult. For patient gardeners seed is the surest way. Given ample drainage and kept free from crowding competitors it goes on for years, and it never has a dull moment.

KATHLEEN MARRIAGE

Colorado Springs, Colorado

FROM THE MIDWEST HORTICULTURAL
SOCIETY

Akebia quinata

This charming climber is one of the comparatively unknowns in the gardens of the middle west. This was first called to my attention by its discovery on the walls of an old building in Lincoln Park where it had been growing untended and unnoticed for many years. There it had competed with Boston ivy, and poor conditions. It had been in

a measure successful enough to cover a small part of the wall. Cuttings taken and placed in good soil soon took hold and produced nice plants in a few months' time. After a winter fully exposed, these small plants have sent out runners some three feet long with the promise of getting up into the air next year.

Apparently this plant has proved its ability to survive the rigors of the Chicago climate. With good culture this should prove an excellent subject. While generally regarded as evergreen this species does not retain its foliage completely through the winter, but it is retained quite long and hence should be used where good winter effect is desired. For summer effect the five-fingered leaves are quite attractive with their smooth margins and light green color. As this is a twinner, some slim support will be needed until the plants have some height and developed wood enough to remain upright. With this listed commonly in eastern catalogues there is no reason why it should not be more generally planted in this region where it will doubtless give a good account of itself and prove one of the attractive vines.

Convallaria majalis, pink

Everyone is familiar with the common Lily-of-the-Valley. As a dependable plant for shady spots it is one of the old standbys. Once planted the lily-of-the-valley perpetuates itself by underground runners which send up new plants. It is generally only a short time until these underground runners take possession of the entire area into which they can spread. In addition to the widespread white form there is a pink variety which has been listed at fancy prices. This pink form is identical with the species in every detail

*K. N. Marriage**Eriogonum subalpinum*

except color which is pale flesh pink. As something different it is a desirable plant for shady places where a rampant groundcover is needed. However, the color is not the glowing pink that enthusiastic catalogues might hint, but a pale delicate shade that is pink mainly by comparison.

Azalea Vaseyi

The Middle West is not usually considered a region for Ericaceous material although many localities have numerous species represented in the local flora. The inhibiting factors are in the soil much more than in the climate. With a little care in soil preparation many of the excellent azaleas and rhododendrons can be successfully grown.

One of the finest azaleas that can be grown is *Azalea Vaseyi*. This is native to the Mountains of North Carolina and is considered to be the finest of the American azaleas. Apparently this is quite an adaptable species as it is recommended for pondside planting. However, like many other species it is quite tractable under cultivation and a moist soil suitable for other heaths will prove quite satisfactory. Because this species is limited in range it is seldom offered as a collected plant, or as a nursery acclimated plant. This is usually sold as nursery grown material and consequently commands a higher price than many of the other native species. The flowers are in clusters at the top of upright growing stems which form a

round topped bush. The flowers are about 1½ inches in diameter and a rosy pink in color. It is a May blooming species in the mid-west. It seems to be one of the hardiest and most dependable of the azaleas and it is one that should be in every collection of desirable shrubs.

Tree ferns of Hawaii

When the news reports of December 7 brought the story of Pearl Harbor my eyes strayed across the room to the small stems of tree ferns (*Cibotium chamissoi*, *C. menziesii*) which are my direct link with the islands. Small fellows with foot high trunks and eighteen inch leaves, they have graced the north window for several winters with their graceful foliage.

Practically unrepresented in large collections these species are among the most striking of the tree ferns. The leaves spread upward and outward from the stem, which is tall and robust growing. The matted hairs covering the buds are golden in *C. chamissoi*, and *C. glauca* and a mahogany brown in *C. menziesii*. The foliage is a shining dark green in the latter species and somewhat lighter in the other two. The trunk is usually a matted mass of roots, from which the plant can obtain most of its supply of moisture. In fact, when these plants are collected the soil roots are generally cut off and the stem shipped with merely the air roots. If kept moist these soon multiply and provide a new system of anchor roots while supplying all of the plants water needs at the same time.

These species of the Sandwich Islands are distinct from any growing in other parts of the world. Probably in the distant past they have descended from some of the primitive ferns that inhabit the tropics of the Polynesian re-

gion. Whatever the affinities of these ferns to the vegetation of the rest of the globe they are definitely distinct and isolated now. On the island of Oahu the ferns are dominant in many places and form veritable jungles. Under these conditions the plants develop stems up to sixty feet in height, with leaves eighteen feet long and nearly as broad.

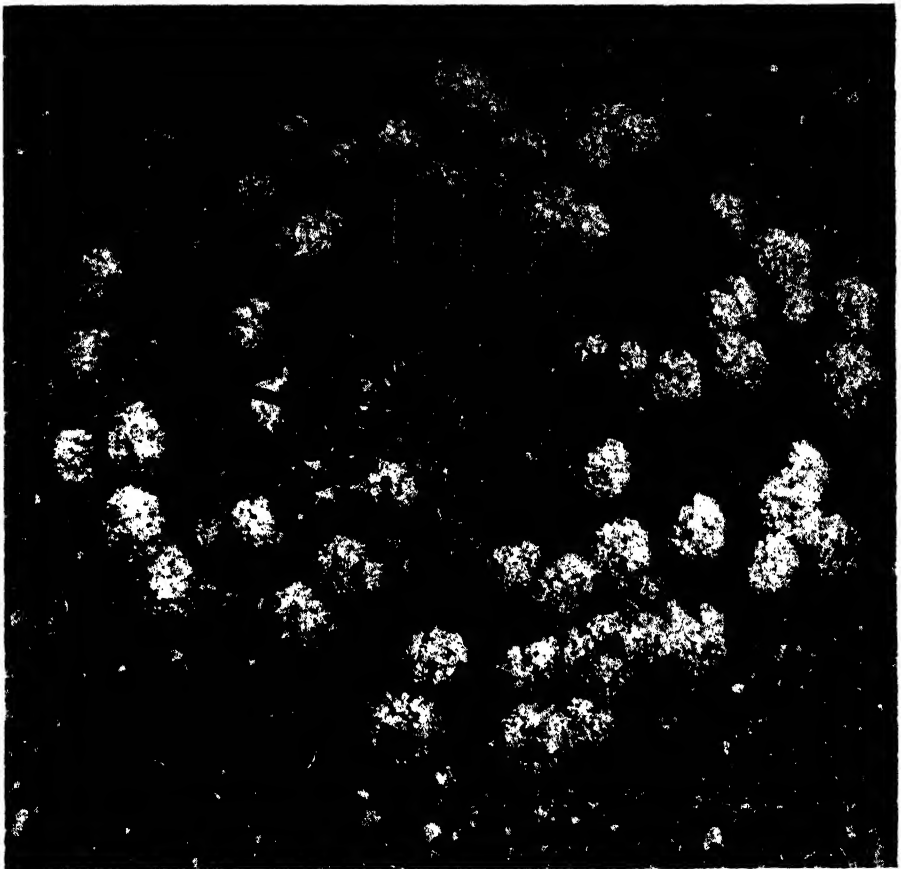
Before the advent of the white man to the islands the trees were a source of starch. The larger ferns were cut down and the small core of starch removed from the center of the stem. This was washed, pulverized and diced and then used in making the famous "poi" of the natives.

Making starch from tree ferns was a laborious and slow process. Only the larger trunks were useful as the small cores of young plants did not repay the labor involved in cutting them out. The cores had to be transported to the towns where the remainder of the manufacturing took place. With the introduction of the taro plant the importance of tree fern starch diminished until the last factory vanished about a decade ago. Now the tree fern remains as a weedy native or a beautiful ornamental depending on the proximity of the forests.

In this country the transplanted ferns are excellent subjects for conservatories, greenhouses or carefully tended window gardens.

Alliums (Onions!)

In writing of alliums in the October 1941 issue of THE NATIONAL HORTICULTURAL MAGAZINE Mrs. Fox mentions *Allium odorum*. Since the publication of Grey's *Hardy Bulbs*, Vol. 3, the confusion of alliums grown under the name *odorum* is cleared up. *Hortus Second* follows the reclassification by



K. N. Marriage

Erigonum ovalifolium, in captivity

Grey. In many gardens there have been two rather similar species of white flowered alliums known as odorum, which are now separated to *Allium ramosum* Linnaeus and *Allium tuberosum*, Röttler ex Sprengel.

The earlier flowering, July-August, *Allium ramosum*, is the one more often recommended for its delightful fragrance. Mrs. Fox mentions heliotrope; I have compared it in my notes to that of hawthorn. *Allium ramosum* easily can be separated from *Allium tuberosum* on leaf characters: *A. ramosum*

has hollow leaves, those of *A. tuberosum* are not hollow. A native of Siberia, growing up to 18 inches in neat clumps, this is a plant of value not alone to convince scoffers that an onion may smell sweetly.

Beginning in early September and spreading its blooming period more than most species, *Allium tuberosum* makes a pleasing border plant of 15 to 18 inches. Its foliage makes an effective foil for the abundant stems of white flowers; good foliage does not obtain throughout the Allium family. Grey

states that *A. tuberosum* is a native of northern India and the Far East, where it is in common use as a culinary herb. It is, however, a perfectly hardy plant. There is no noticeable fragrance to the flower but it can be used as a cut flower as *A. neapolitanus* is now used.

I do not have at hand Mr. P. J. Van Melle's discerning discussion in *The Florists Exchange* that established for a time the validity of the name, *Allium odorum*, but, as in other articles he discusses the fragrant species, I expect he may accept priority of the Linnaean, *A. ramosum*, over *A. odorum*, also Linnaean. Other authors have used the name *odorum*, however, and Grey disposes of them as follows: *A. odorum*, Karelin and Kirilow—synonym of *A. angulosum*; *A. odorum*, Lapeyrouse—synonym of *A. ochroleucum*; *A. odorum*, Tenore—synonym of *A. nigrum*.

BERNARD HARKNESS

Molucella laevis (See page 107)

The shell flower of *Molucca balm* is a curiously interesting member of the mint family which once persisted in old-fashioned gardens by self-seeding. It is now comparatively rare. Although the garden value of this plant should not be emphasized unduly because of several undesirable features, a small planting would be decidedly worth trial by any gardener with a taste for experimentation. The generic name has also been spelled *Mollucella* and *Moluccella* and a similar uncertainty apparently existed concerning its native habitat. As the name indicates, the plant was thought originally to come from the Molucca Islands, but actually is from the east Mediterranean region, in Syria.

Seeds may be sown in the open in the vicinity of Washington, D. C., but starting under glass is recommended

for places with a shorter growing season. A sandy loam is advised, but cultural requirements are simple. The flowers are slightly fragrant but inconspicuous, and the chief feature is the greatly enlarged calyx which surrounds the flower in the shape of a sea shell. The color is greenish with a faint pinkish blush, and covered with numerous reticulations. The spikes remain in an attractive condition for a fairly long time after the flowers fade and some very distinctive decorative arrangements might be made with them. After the plants flower in July and August, they tend to dry off suddenly, leaving an unattractive mass of yellowed foliage during the fall. Planting chrysanthemums in the foreground might be a satisfactory means of dealing with this shortcoming. Another fault from a garden standpoint is a somewhat sprawling habit of growth.

V. S.

Adenium obesum DC. (See page 105)

In *Curtis Botanical Magazine* (t. 5418) there is a plate of this plant that does not resemble our photograph in the amount of foliage and the luxuriance of growth. The plate suggests, as presumably it should, a plant obviously affected by the climate, with thickened succulent stems, relatively few points producing short spurs of leafy growth and flowers.

The brief text (l.c.) is worthy of quotation in part, "Several healthy plants were kindly sent to us from Aden by J. Olding, Esq., of the Peninsular and Oriental Company's Steamers, in 1862, and from the finest of these plants, nearly three feet high, our figure has been made, in August 1863. * * * judging by a photograph sent us * * * the shrub attains a very large size, and exhibits a most curious aspect with its thick tortuous branches, and



H. F. Loomis

Adenium obesum
(natural size)

[See page 104]

very gouty base of the trunk; the flowers, however, are handsome and not much unlike those of the *Oleander*, to which family of plants this belongs. A second species (*A. Honghel* De Cand.) is found on the Senegambia. Lindley speaks of this (or probably an allied species) as found at Delagoa Bay. It evidently affects a hot dry country."

Flowers are rosy white edged pink and dotted carmine.

The plant that supplied the photograph was introduced to this country not from its native heath but from plants cultivated in the West Indies. Whether or not life in these more abundant climates is responsible for the great improvement in its appearance is difficult to tell. The photograph shows only flowering shoots, but they are well clothed with leaves and the flowers come not singly but in oleanderlike groups. This makes a striking contrast with the plate already cited.

Sternbergias

This is a very small genus but a most charming one, in which there has been a great revival of interest since the re-planting of *Sternbergia lutea* in the gardens at Williamsburg, Virginia, where the tradition is that they were first planted at the Governor's Palace and from there distributed to various gardens in all parts of Virginia and eastern North Carolina. From those old gardens they are being restored to the bulb trade in the United States, being falsely named "Fall Crocus" by many persons — although they do resemble in flower a giant yellow Dutch crocus. The autumn-flowering species with their clear yellow, erect blossoms are among the most delightful of all hardy bulbs. Unauthenticated legend names *Sternbergia* as the "Lily of the Field" of the Bible. Some varieties flower before the foliage, others at the

same time and one produces foliage considerably in advance (*S. macrantha*). They should be planted in full sun and well drained soil, where they can undergo a period of dry dormancy during the summer months. If rapid increase is desired the bulbs should be planted three to four inches deep in rich sandy or humus filled soil.

The late September flowering *Sternbergia lutea* is the only variety available in this country, although there may some day be unearthed in some old garden in Virginia, North Carolina or South Carolina the form known in England as *S. macrantha*, which produces its leaves well in advance of the appearance of the flowers in October and November (Grey, Hardy Bulbs, Vol. 2), and may be what was known to Clusius and Parkinson as "Persian daffodil." Both of these forms are said to be widely distributed throughout the middle and eastern Mediterranean basin as far east as Persia. *S. colchiciflora* has a rather small bulb, and the small and beautifully dainty blossoms appear in late August and early September in my garden with no accompanying foliage. The bulbs I have were collected originally, I believe, in Asia Minor. *S. graeca*, a native of the mountains of Greece, has proved fickle in my garden and sulked for two winters before showing any sign of life above ground, finally putting forth short and narrow leaves last spring, but produced no blossoms in the fall. *S. sicula*, said to be a native of Sicily, has produced regularly slightly larger but similar foliage each fall, but no blossoms have put in their appearance. The foliage of both these varieties is very short and narrow in comparison with the sturdy and tall foliage of *S. lutea*. *S. Fischeriana* is the only spring blooming variety and has withstood three winters in my garden in a southern



Molucella lacvis

[See page 104]

exposure but did not bloom last spring in March because nipped by snow and sleet. According to Colonel Grey, it is a native of the Caucasus, and therefore it should be the hardiest of the group. A new species reported from the Caucasus in 1936—*S. Alexandrae* sp. n.—found, I believe, by M. F. Sakhokia in Kabistan District of Azerbaidjan, and described by D. I. Sosnovskii (Akademia nauk. Azerbaidzhenkii filia Botanicheskii Institut Trudy, Vol. 2, 1936). However, I am sceptical until I see the plant and the blossoms—it may only prove to be a local variation of *S. lutea* or *S. macrantha*. In the September, 1941, Bulletin of the Alpine Garden Society Miss Ruth McConnel mentions finding in December on the road between Jericho and Amman in Trans-Jordan a variety named *S. Clusiana*. Could this perhaps be *S. macrantha* masquerading under another name, especially in view of the late blooming period, a characteristic of *S. macrantha*?

ROBERT C. MONCURE

Primula Forrestii

This species is probably the best known of the Bullatae Section, which has provided good garden plants.

It is truly an Alpine primula which resents moisture in winter, but revels in well-drained, lightly shaded positions, and although it may be grown as a pot plant, it is better adapted to planting in high positions in the rock garden, or on a dry wall.

As to soil conditions *Primula Forrestii* is reputed to do exceedingly well where lime is present, and is moreover supposed to be a native of limestone districts.

On the other hand it is known to flourish where there is no lime, and this I can vouch for, as here it has proved to be as robust as the common

polyanthus, and appears to be one of those plants that can be happy in either calcareous or acid soil. Unfortunately it is short-lived unless precautions are taken to give protection from the winter rains which are anathema to it.

Owing to its dislike to our winter season it has been thought to be of dubious hardiness, but I am convinced that it is excessive moisture and not frost that is the greatest enemy of this primula.

It is of very distinct appearance, forming a very tough, wooden, creeping stem, from the base of which the oval and wrinkled leaves are formed into rosettes.

The flowers which are produced in drooping clusters are of a rich golden yellow, and possess a delightful fragrance; a characteristic which is also to be found in the dark green leaves.

Primula Forrestii is easily raised from seed, which it produces in ample quantities. Incidentally, this is the only means whereby propagation can be successfully carried out.

H. JEFFREY

Totnes, Devon, England

Bletilla striata

There are always plants in one's familiar catalogues that intrigue the fancy but never quite enough to precipitate one into purchase, until there comes a time when one does capitulate as if to lay a ghost. The subject of this note is or has been such with me.

In the autumn of 1940 the roots were bought and planted at the foot of a gentle slope in soil well dug with the same sort of leaf compost that delights the azaleas that line the upper slope, covering the tuberous rhizomes that looked as if they might do their own deciding about coming up, not more than five inches.

They did come up, but the season



H. L. Loomis

Bauhinia sp.

[See page 110]

of 1941, with its prolonged drought through the summer and early autumn, brought forth no greater harvest than small rather sparing tufts of finely plaited leaves that suggested those of the tigridia in a faint way, this and never a sign of flower. There was little thought, however, that the roots would have grown enough in this ill season to give any reward in 1942, but June brought a fine surprise in five flowering stems. Perhaps they touch a foot in height, rising above the leafy base, with small but beautifully fashioned flowers, more or less like a cattleya at first glance. The best stalk had five flowers, the weaker one or two. The color is hard to define, purple as in Hortus seems a little too strong although the color falls there assuredly. It is warm and pure, partaking both of deep rose and of violet, with darker markings on the lip.

Whether or not they will remain as hardy residents in this rather casual garden remains to be seen. They have passed through zero weather with their leaf mulch and one fine drought. That seems a favorable augury for permanence.

Takoma Park, Md.

Bauhinia sp. (See page 109)

Nearly every gardener from the North who goes to Florida for the winter, know the brilliant orchid-like flowers of *Bauhinia variegata*, which in good seasons cover the tree with their amazing blooms, common enough in the opinion of those who pursue only the strange and rare but still eye-filling in their own right, whether they be in the type color which is rosy purple or in the more chaste pure white form. He knows too the similarity or better the suggested similarity of the leaves to those of the Judas or red-bud tree, a suggestiveness which comes more from their carriage on the tree and their color and surface than from their shape, since these are two-lobed and not heart-shaped as in our tree.

But it sometimes happens that knowing the genus only from this one species, he does not carry over the similarities to those species that are more nearly clambering woody vines than trees or shrubs.

The subject of this note is such and more will follow at a later date to recount its particular characteristics and value.

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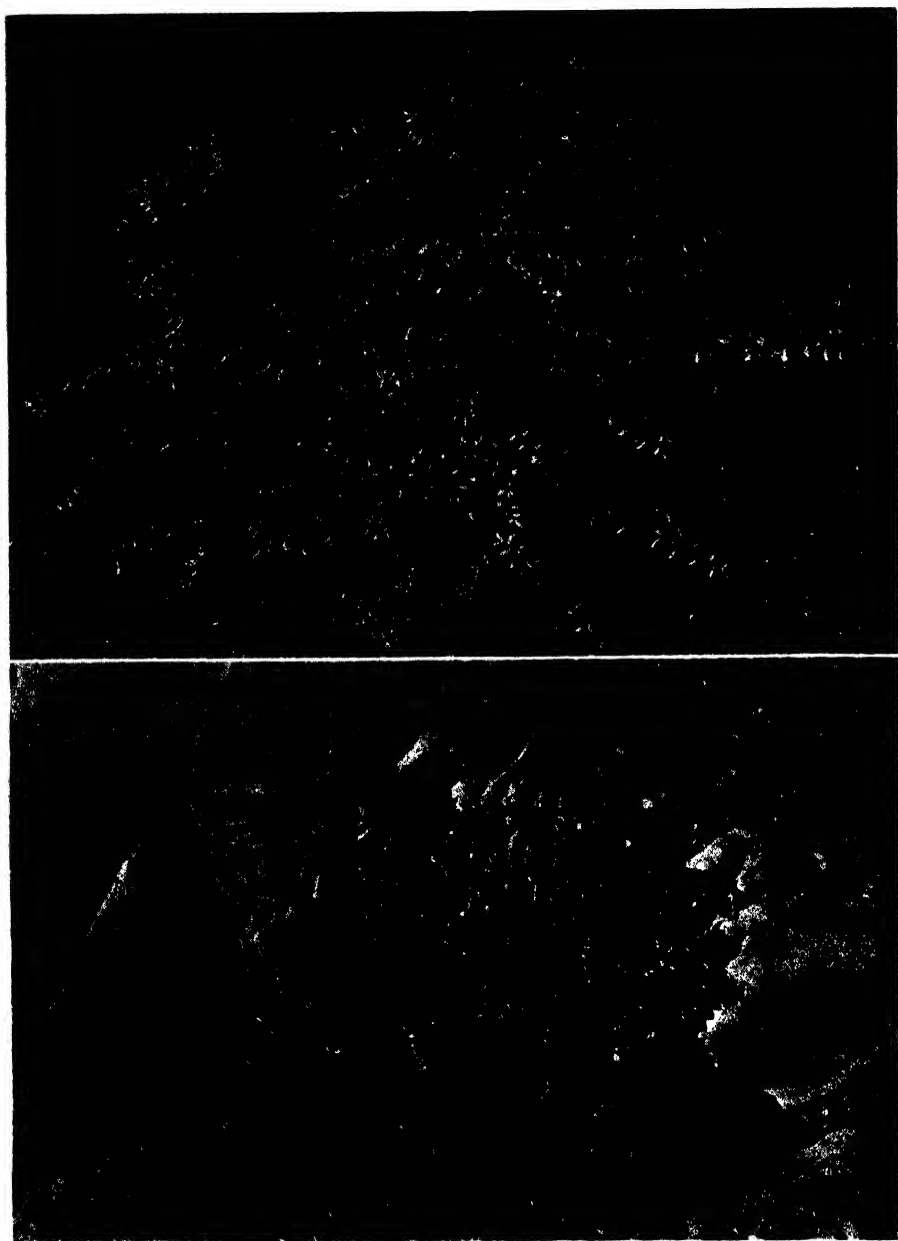


Fig. 1. *Pellaea andromedaefolia*, grown in heavy soil in an open situation; photographed against an artificial background. Height of clump 14 inches, Berkeley, Calif.

Fig. 2. *Pellaea Bridgesii*, growing in shale rock at 7,500 ft. near Echo Lake, Calif.

Some Xerophytic Ferns Worthy of Cultivation

W. C. BLASDALE

One associates ferns with habitats in which there is an abundance of soil-moisture, a humid atmosphere and at least partial shade, for it is in regions that insure these conditions that the number of species is at a maximum. Nevertheless the arid and semi-arid regions of the southwestern portion of the United States, as well as the mountainous regions of the states bordering the Pacific, are the homes of a large number of species which are true xerophytes. Many of them have decided ornamental value; others possess attractions akin to the oddities of form and structure peculiar to succulents.

Most of the species concerned are representatives of the genera *Pellaea*, *Cheilanthes* and *Notholaena*. They differ from the more widely cultivated ferns in that the expanded leaf surfaces are reduced to a minimum as a result of thickening and subdivision of the fronds, and by the presence of scales or fibers, which form a woolly or cottony tomentum, or of farinose or sticky secretions derived from small glandular hairs found on the lower leaf surfaces. To these peculiarities should be added certain features of the life-cycle, especially an unusually long rest-period during which there is not only complete cessation of growth but apparent extinction of life itself, although advent of the rainy season causes the curled, bone-dry fronds to expand and once more assume their normal functions. In this respect they resemble certain mosses and lichens, or still more, certain of the desert inhabiting selaginellas. Just why the active cells of these plants are able to survive a degree of dehydration fatal to most plants is a mystery. Specimens which have

reached such a degree of dryness are not likely to appeal to the artistic sensibilities of the average gardener, nor is it probable that many gardeners could provide the conditions which bring about such a degree of dehydration. As to the behavior of ferns of the desert type, when given an opportunity to develop under normal conditions we have but little data; at least some of them not only tolerate such changes but retain the pleasing features of their short growth period throughout the yearly cycle. Further there are rock ferns of a less extreme type, largely mountain plants frequenting rocky crevices and gravelly talus slopes, which are known to be adaptable to a wide range of soil and climatic conditions. At least twenty-five species could be selected from these two groups which give promise of becoming useful additions to our long list of alpine and rock plants which can be grown far beyond the limits of their natural habitats. Some of these are already found in the trade lists of certain nurserymen. I will consider here only those with which I have had some experience.

Pityrogramma triangularis (Kaulf.) Maxon. I will first describe the fern known throughout California as the Goldenhack owing to a dense coating of yellow or white powder which completely covers the lower surface of the fronds. This powder consists of a white wax mixed with a yellow complex compound to which the name ceroptene has been given. The fronds are made up of a four- to ten-inch stipe and a nearly deltoid blade which sometimes reaches a spread of four inches. The root system is superficial but extensive.

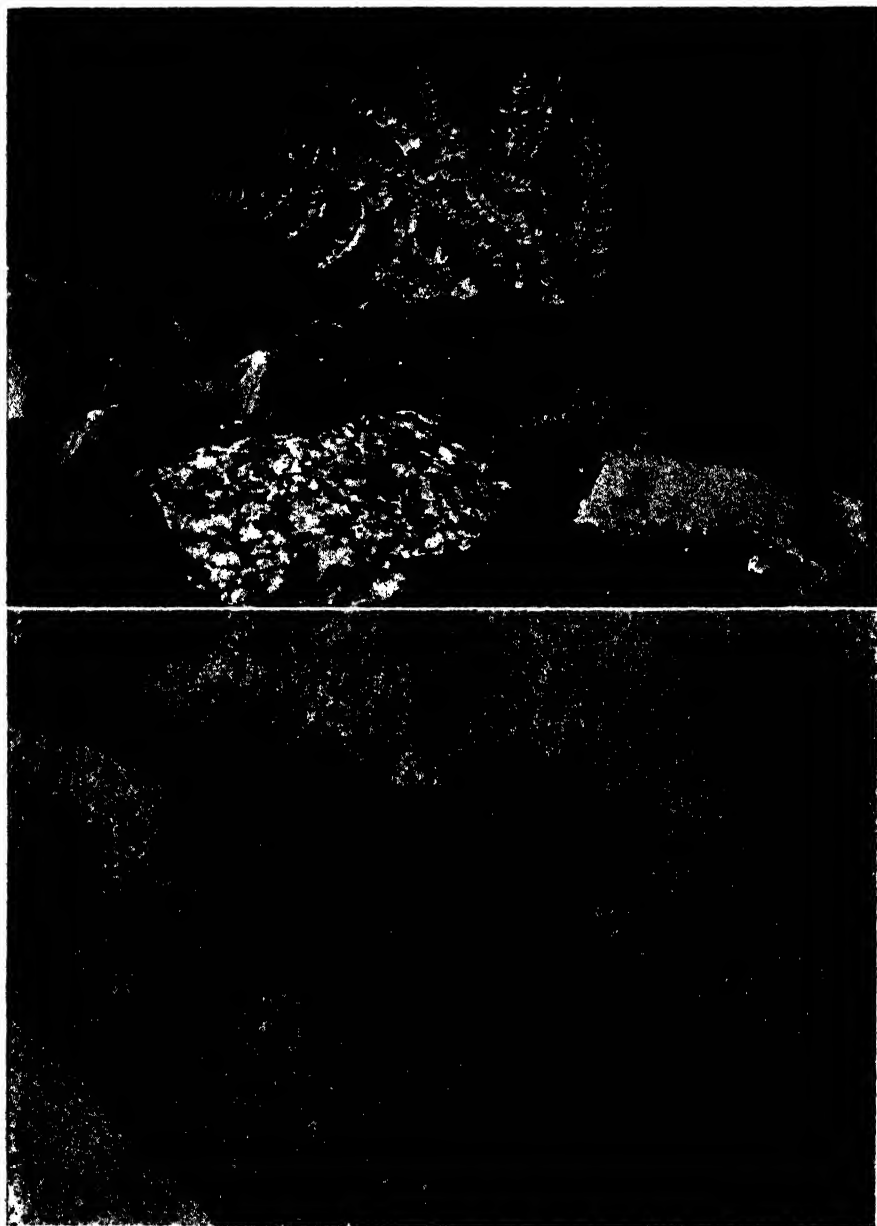


Fig. 3. *Pellaea compacta*, grown in gravelly soil in an exposed situation. Photographed against an artificial background. Height of fronds five inches.

Fig. 4. *Cheilanthes gracillima*, growing in crevices of granite rock at 7,000 ft., near Echo Lake, California.

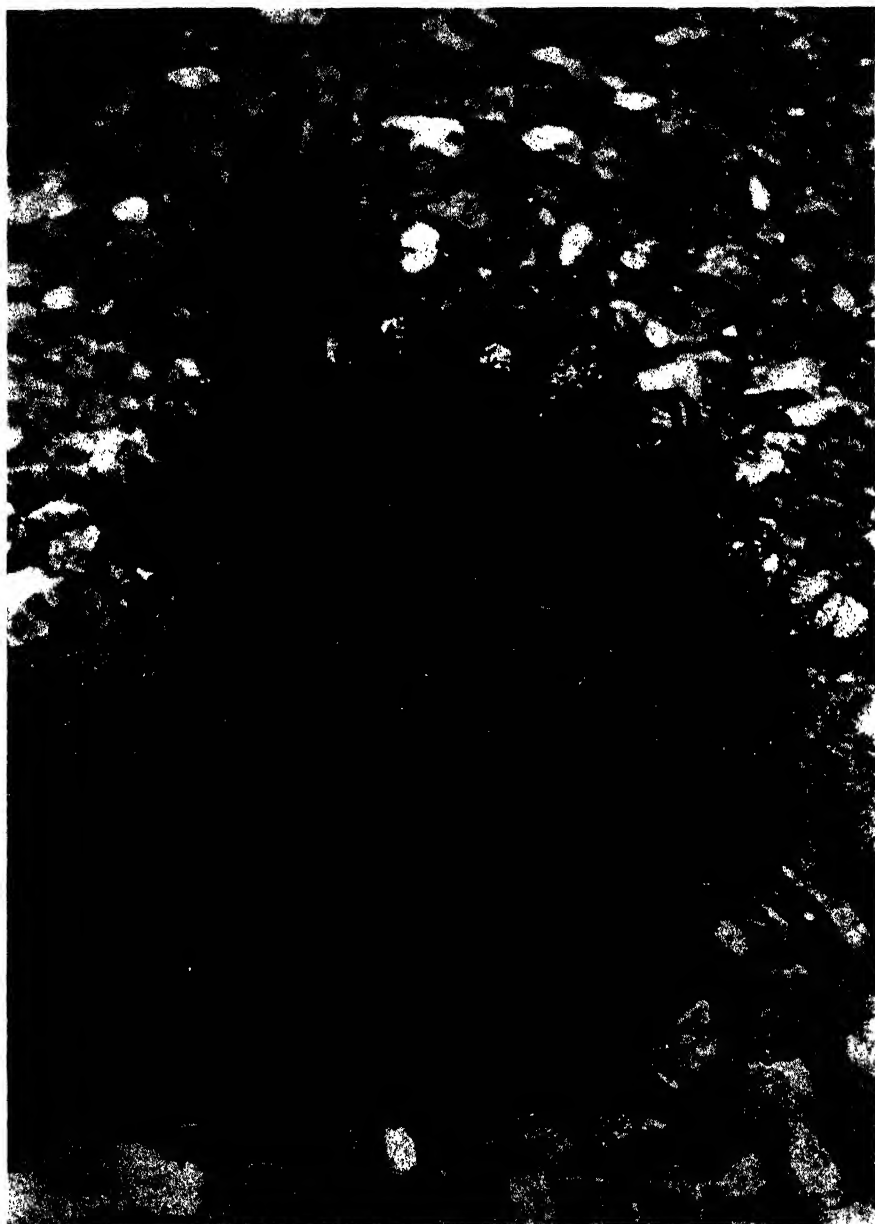


Fig. 5. Pellaea crinitopsis, growing in the University of California Botanic Garden, 1936.

Though usually found in the partial shade of low-growing shrubs, in a soil which may be either leaf-mould or clay, it is one of the first plants to succumb at the beginning of the dry season, causing the blades to curl into compact balls and giving no indications of being alive. They exist in this state during the six or more months of the dry season but if left undisturbed expand into their normal form with the arrival of the first rains. With only moderate shade and occasional watering, even in ordinary garden soils, the fronds remain expanded throughout the year and make attractive plants. Since this species ranges from British Columbia to Mexico, occasionally reaching elevations of 4,000 feet, it should be hardy over large areas in the United States. In nature it reproduces abundantly through spores; there should be no difficulty in propagating it on a large scale.

Cryptogramma acrosticoides R. Brown. The American Rock Brake is widely distributed in the mountain ranges of the West. In the Sierra Nevada one finds its thickly matted rootstocks wedged between the shells which peel off from exposed granitic slopes of the higher peaks. The broad pinnae of its bright-green sterile fronds contrast pleasingly with its erect clusters of fertile fronds which they surround. It is a fine rock plant at sea level but takes some time to become established.

Pellaea andromedaefolia Fee. The species of this genus are distinguished by their small elliptical pinnae, whose edges curl backward to form an indusium which protects the sporangia as in the genus *Pteris*. This species, known locally as the Coffee Fern, is one of the largest and on the whole is the best for use as an ornamental feature of a garden border in either sun or shade. Its fronds do not curl up during the dry season and with very

little water yield tangled masses (Fig. 1) which may attain a height of sixteen inches. It spreads rapidly by means of deep-seated rootstocks. The fronds, like those of many ferns, persist for years after becoming lifeless and detract from the beauty of the younger growth. It is desirable therefore to cut all of the foliage back to the ground from time to time in order to eliminate this defect.

Pellaea Bridgesii Hook. is another crevice plant from the mountains of California and Idaho and is rarely found below 6,000 feet. Its gray-green, pinnate fronds fringe the edges of horizontal rock crevices (Fig. 2) but the root stocks from which these fronds are derived extend far back into their depths. Though perfectly hardy, it is a difficult species to establish but is well worth the effort it may cost to do so.

Pellaea Breweri Eaton frequents the same kinds of habitats as the preceding species but at lower altitudes. Casual observers fail to distinguish it from that species but it is easily identified by the presence of ear-like appendages to the lower edges of the lower part of the rachis. I have had no experience in growing it but suspect that it is more amenable to sea-level conditions than *P. Bridgesii*.

Pellaea compacta Maxon frequents the more arid regions of California and Arizona. Specimens of it collected in Arizona were grown without difficulty in a well-ventilated greenhouse where they were given full exposure to the sun. They succeeded (Fig. 3) even better on a bed of gravel in the rockery. Like all of the species of *Pellaea*, it is easily increased by division of its rootstocks.

Pellaea densa Hook. is a smaller species, widely distributed in the mountain regions of the western states. It is one of the most pleasing and most easily grown of all rock ferns. The deltoid



Fig. 6. *Notholaena sinuata*, grown in heavy soil exposed to full sunshine. Height of immature (about half-grown) fronds seven inches. Berkeley, California.

leaf blades are borne on short delicate stipes forming extensive masses of light green foliage which harmonize with many of the true alpinas.

Pellaea ornithopus Hook., known as the Bird's Foot or the Tea Fern, is a more nearly typical xerophyte. It frequents rocky outcrops where the soil is thin and shade entirely lacking. Although its fronds do not curl, an attempt to gather specimens of it during the dry season yields only a mass of crumbling fragments. Its cultural needs are most easily satisfied in a cactus garden (Fig. 5) and the form and color of its foliage are in harmony with such surroundings.

Cheilanthes gracillima Eaton. In the species of this genus also, the sporangia appear in a line near the edges of the pinnae and are covered by their up-turned edges, but the indusia thus formed are thinner and narrower than in the species of *Pellaea*. Further, in most of the species the pinnae are divided into small bead-like segments and invested with thin scales or fibers. These facts find expression in the term Lace Fern with which the species are associated. This one is especially adapted to narrow rock crevices (Fig. 4) where there is a bare modicum of soil. It is a common species in the mountains of California and parts of Canada and is easily grown either as a pot plant or on beds of gravelly soil.

Notholaena Parryi Eaton. These are distinctively desert-inhabiting species, most of them of small size. They closely resemble the species of *Cheilanthes* but

lack an indument, which deficiency is replaced by a great abundance of white or brown scales or threads, from which they are known as Cotton Ferns. This species is rather frequent in the desert regions of California and Arizona. It yields narrow three- to five-inch fronds which are green and glabrous above but appear to be made up of a series of symmetrically-arranged blobs of brown cotton threads when viewed from below. Although it is scarcely possible to duplicate the boulder-strewn wastes to which it is accustomed I have found it possible to grow it as a pot plant with a fair degree of success.

Notholaena sinuata Kaulf. This is one of the larger species distinguished by its long narrow pinnate fronds whose broad pinnae are disposed alternately on the rachis (Fig. 6). Though discovered in Mexico and described in 1824, it was later found in Texas, New Mexico and California and is reported from Peru and Chile. Although long cultivated in England as a "stove" plant, it does not appear to have been grown in the United States until recently. Through specimens collected by Mr. Eric Walther of the Golden Gate Park in San Francisco "on dry volcanic rocks on the easterly foot of Popocatepetl," it was introduced into California recently and has proven well adapted to general culture in spite of heavy soils, severe frosts and wet winters. It is a remarkably handsome fern and gives promise of being adaptable to a wide variety of climates and exposures.

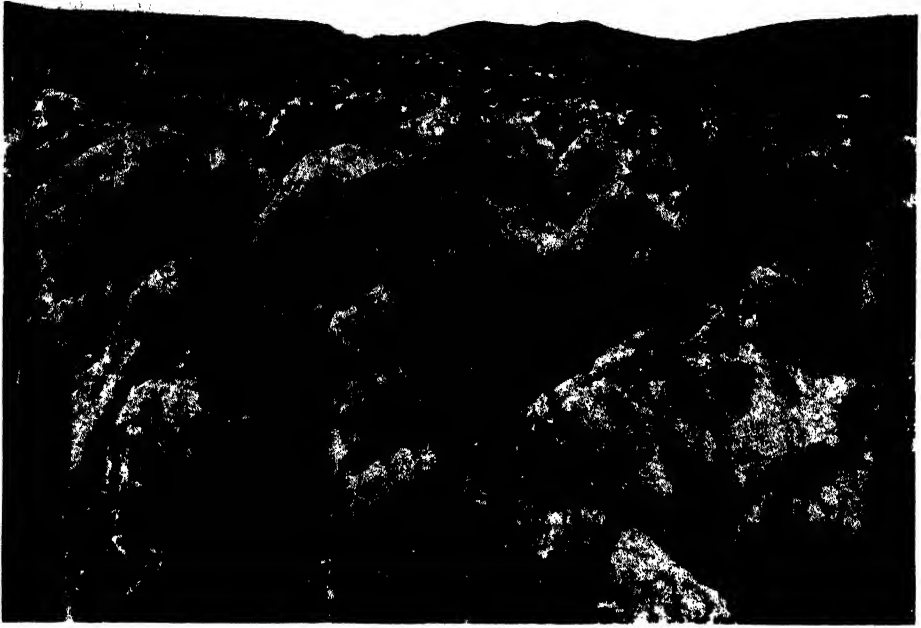


Fig. 1. A general view of Sajsaihuaman rocks.

The Ornamental Flora of the Rocky Cliffs of Sajsaihuaman, Cuzco, Peru

CÉSAR VARGAS C.

For many years I have been observing, in different seasons of the year, the flora of the rocky cliffs, for the most part calcareous, that are found near the thousand-year-old fortress of Sajsaihuaman (on a hill to the north of the city of Cuzco) in whose concavities, fissures and interstices there are growing many plants, perhaps more than sixty species. Those which claim my attention now, however, are those which through the beauty of their flowers give the title to this article. (See Fig. 1.)

It is truly something to be wondered at how these hard rocks, for the most part exposed, can shelter in the tiniest space plants whose conspicuous and brilliantly colored flowers make them

into great natural gardens. Here one may admire (naturally in certain seasons of the year) the yellow-orange, red-orange, red and cream flowers of species of *Stenomesson*, *Crocopsis*, etc., some of which spring from the fissures of the hard and dry rocks, weathered by cold and heat—as if in defiance of these hostile factors.

How many times, stooping down, I have contemplated minutes on end, asking myself what mysterious force these delicate plants possessed to make their way through the hard soil full of stones and sharp rocks. But the creative forces of Nature, who knows all in advance, have protected the floral scapes (particularly in the *Amaryllis* and *Iris*



Fig. 2. *Pitcairnia ferruginea*.



Fig. 3. *Eustephia coccinea*.

families) with bracts that strongly enclose the tender bracts while they emerge from the dry and hostile earth.

Among the flora to which I allude, the Amaryllidaceae surpass the rest as ornamentals. These are the most abundant in this locality and flower at the end of winter and in the spring for the most part, then the Iridaceae, Polemoniaceae, Oenotheraceae, etc. As I believe this botanical essay is of interest to horticulturists, I am going to give brief descriptions of the species of the ornamental flora, adding data with reference to the times of their flowering and reproduction. Most of them are illustrated by my own photographs or sketches.

BROMELIACEAE

Pitcairnia ferruginea R. at P. (Fig. 2). Perennial plant, 1 m. in height, to the tip of its inflorescence; the inflorescence, paniculate, pyramidal, covered

with ferrugineous, stellate scales; floral bracts acute, longer than the pedicels, flowers 2-2.5 cm. long, densely ferrugineous, petals greenish, 1.5 cm. long, longer than the sepals. The size of the plant and of its parts varies with the altitude and the climate. (See Flora of Peru, by J. F. Macbride, Vol. XII, p. 526: Pub. 363, 1936.) Flowers from November to March.

Reproduction — by seeds or lateral buds which complete their growth in three years and then flower.

AMARYLLIDACEAE

Eustephia coccinea Cav. (Fig. 3). Up to 60 cm. high, with the leaves usually developing after the flowers, but sometimes as seen in the picture, flowers 2-5, perianth bright red, green tipped, 3-4 cm. long. Flowers in August until November. Widely distributed in southern Peru.

Reproduction — bulbs or bulblets,

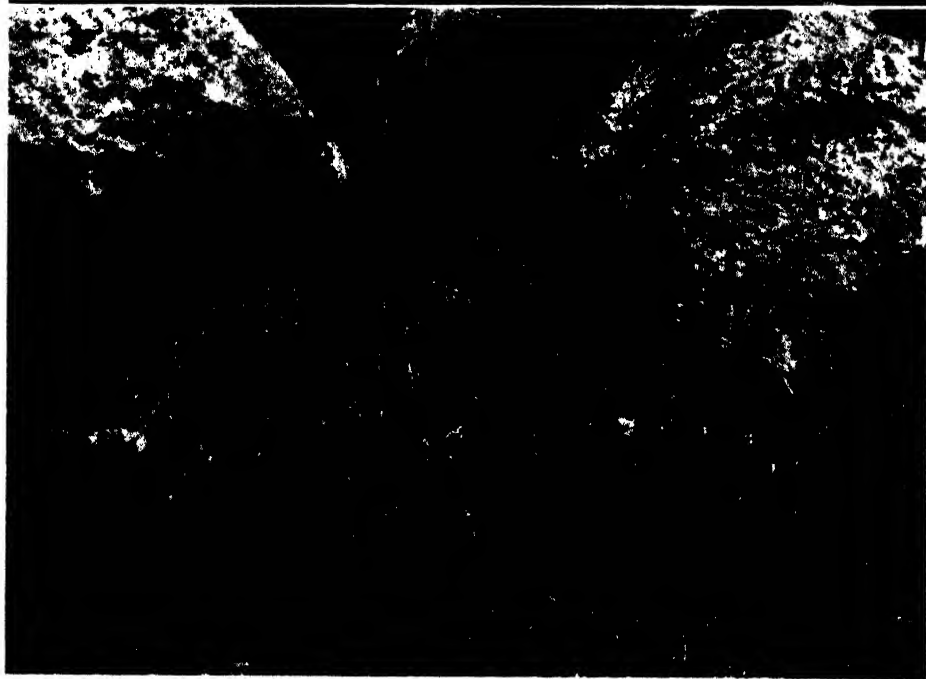


Fig. 4. Stenomeson Pearcei (upper).

Fig. 5. Stenomeson variegatum (lower).



Fig. 6. *Stenomesson aurantiacum*.



Fig. 7. *Bomarea involucrosa*.

which are formed about the principal mother bulb.

Stenomesson aurantiacum (HBK) Herb. (Fig. 6). From 25-30 cm. high. Bulb subglobose, leaves linear, developed after flowering, flowers 2-6, perianth red-orange, 3.5-4 cm. long, cup simple and acute, toothed in my specimen. Flowers, at times, from the end of May until August.

Reproduction—bulbs and bulblets.

Stenomesson Pearcei Baker (Fig. 4). Up to 80 cm. high, leaves sometimes developed after flowering and sometimes with the flowers; flowers 5-8, perianth 1.5 cm. long, with broad limb, yellow-cream, green-tipped, cup teeth bifid. Flowers from the end of May until September.

Reproduction—like the last cited.

Stenomesson variegatum (R. et P.) Macbr. (Fig. 5). Undoubtedly one of

the most beautiful of the genus because of the beauty and size of its flowers; peduncle up to 1 m. or more, flowers 2-6 or more, pedicels short, slightly curved, perianth tube 8-10 cm. long, bright red, green keeled at the apex, cup bifid. Flowers in December and January.

Reproduction—like the last.

Bomarea involucrosa (Herb.) Baker. (Fig. 7). An erect herb up to 2 m. high, densely leafy throughout, recurved at summit; leaves linear-lanceolate, 12-22 cm. long, 8-12 mm. wide, flowers up to 20; primary rays short, 6-9 mm. long, forked once or very rarely twice, floral bracts transparent white, perianth up to 7 cm. long, cream green-tinged. Flowers from November to January.

Reproduction—Seeds.

Bomarea ovata (Cav.) Mirb. (Fig.



Fig. 8. Bomarea ovata.



Fig. 9. Cypella Herrera

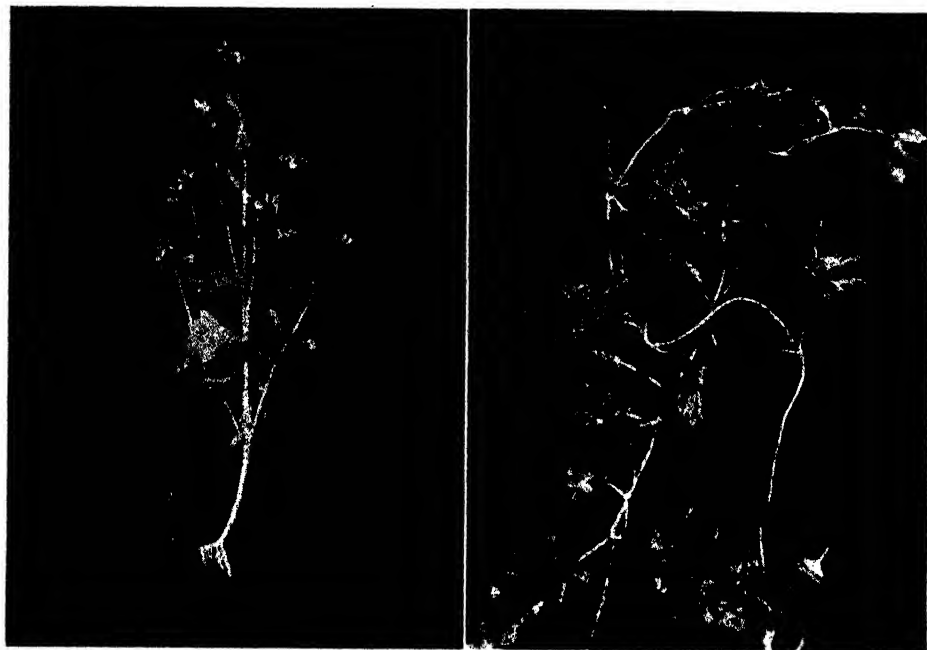


Fig. 10. Loasa Cuzcoensis; Fig. 11. Cajophora Pentlandii

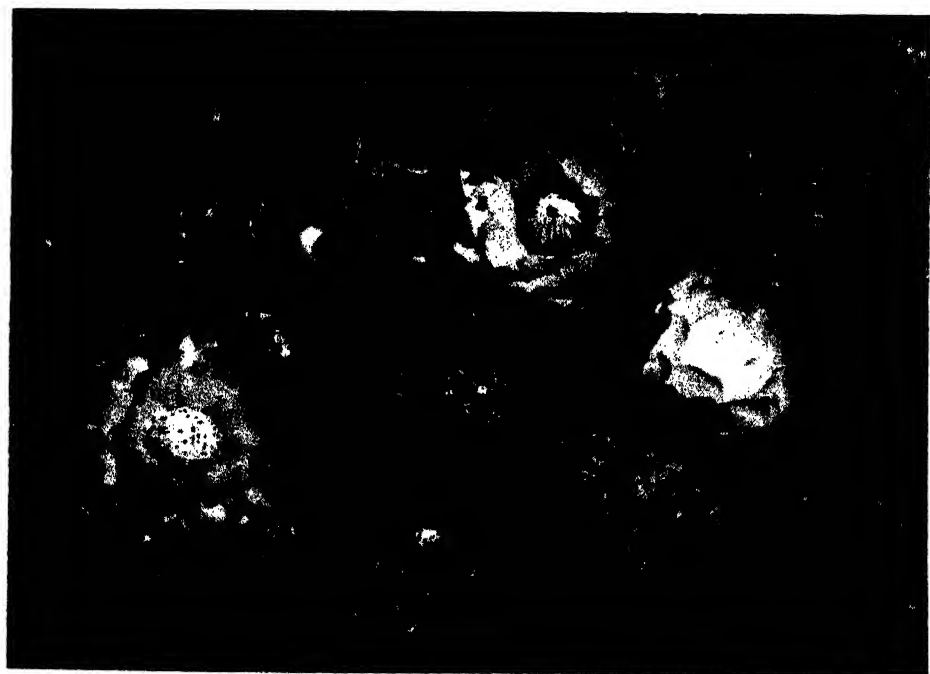


Fig. 12. Opuntia floccosa



Fig. 13. *Lobivia corbula*

8). In this rocky habitat, generally suberect, as seen in the picture. Floral rays 6-8, flowers about 3 cm. long, sepals dark red, green-tipped, petals green dotted purple, subequal. Flowers from November to March.

Reproduction—seeds.

Crocopsis fulgens Pax (Fig. 17). Leaves linear 9-28 cm. long, 2-2.5 mm. wide, developed after the flowers; bulb ovate, long neck; flowers solitary, red orange and black dotted when dry, rising directly from the bulb (like a crocus) 6 cm. long. Flowers from September to November.

Reproduction—Bulbs, Bulblets.

Urceolina peruviana (Presl.) Macbr. Bulb globose, leaves developed after the flowers, narrowed at each end and wide at the middle, about 3.5 cm. wide, peduncle 12-20 cm. long, flowers, stamens and stigma exerted. Flowers from July to October.

Reproduction—like the last.

IRIDACEAE

Sisyrinchium Jamesonii Baker. 6-20 cm. high, root fasciculate, leaves many sessile, linear; flowers yellow, 12-16 cm. long, fruit a capsule. Flowers from February to April.

Reproduction—Seeds.

Sisyrinchium chilensis Hook. 20-40 cm. high; root fasciculate, leaves almost sessile linear-lanceolate, dentate, 20-30 cm. long, 2-3 wide. Inflorescence a long spike with 5-6 blue flowers, pedicels 15-25 mm. long, with bracts like the leaves but much smaller and acute. Flowers February to April.

Reproduction—Seeds.

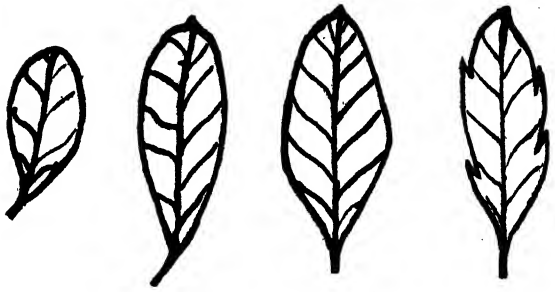
Cypella Herrera Diels. (Fig. 9). Bulb from 2-3 cm. long to 10-14 mm. wide, leaves linear, acute, nerved, 10-20 cm. long or more, 3-4 mm. wide; flower usually solitary or rarely 2, peduncle 20-40 cm. long, with two bracts 4 cm. long, 5-6 cm. wide, perianth blue 3-4 cm. in diameter. Flowers from De-



Fig. 14. Fuchsia macrantha



Fig. 15. *Cantua candelilla*



Leaves, natural size

mm. long, 5.8 mm. wide, with many black seeds. Flowers from February to May.

Reproduction—Seeds.

The same species in lower altitudes and warmer climates makes a much greater growth.

Cajophora Pentlandii Don (Fig. 11). Like the last, this prefers the shade of the rocks. Stem slender, climbing, less spiny than *Loasa Cuzcoensis*,

cember to April, each one of very brief duration, opening in the morning and closing toward evening.

Reproduction—Bulbs; because I have never obtained it from seeds, possibly sterile.

LOASACEAE

Loasa Cuzcoensis Killip (Fig. 10). Prefers to protect itself in the shade of the rocks. 40-60 cm. high, upright; stalk and leaves densely covered with brown spines 3-4 mm. long, leaves 6.5-10 cm. long and 5.5-6.5 cm. wide. Many flowers pedicels 15-20 mm. long, slightly curved at summit, calyx persistent and spiny, corolla white 2-3 cm. in diameter; fruit a capsule 15-20



Fig. 16. *Cantua buxifolia*, National flower of Peru

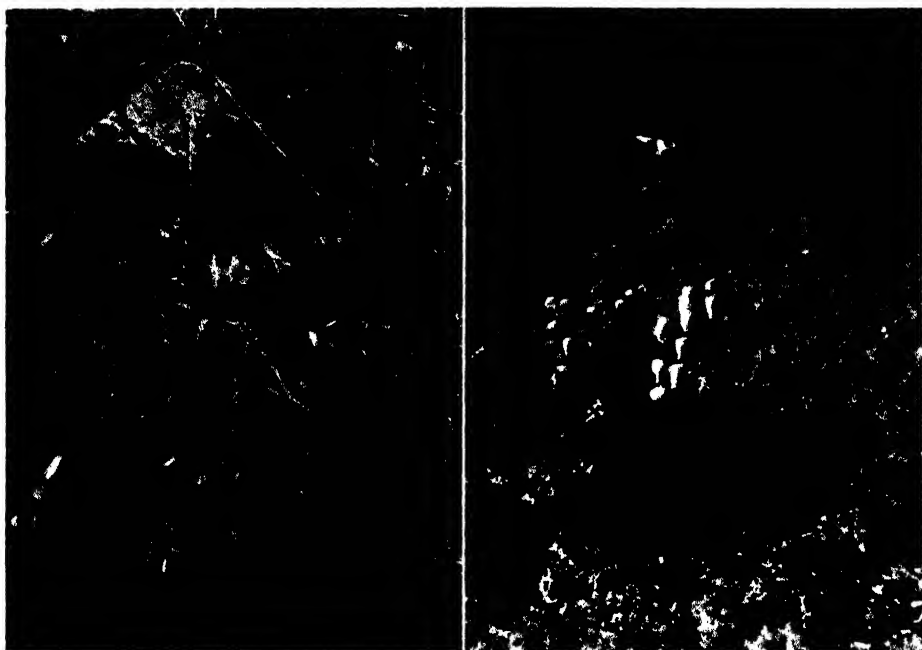


Fig. 17. *Crocopsis fulgens*; Fig. 18. *Calceolaria bartsifolia*

leaves petiolate, the blade 6.5 cm. long, 3-3.5 cm. wide, with white spines. Flowers axillary, peduncles 4-5 cm. long, corolla light red from 25-30 mm. in diameter; ovary very spiny. Fruits conic capsules, dehiscing from the twisting of the carpels, seeds black. Flowers almost all year and particularly if there is water and the place is not too cold.

Reproduction—Seeds.

CACTACEAE

Opuntia floccosa Salm Dyck (Fig. 12). As one can see from the illustration, this plant grows in "clumps or low mounds sometimes 1 to 2 meters or more in diameter, with hundreds of short, erect branches, covered with very hard, white to yellowish hairs 3-5 cm. long; flowers yellow 5.5 cm. in diameter. In cultivation, loses a great part of its hairiness and grows more slender

and taller. Flowers from September to December.

Reproduction—Seeds or vegetatively by any fragment of the stalk.

Lobivia corbula (Herrera) Britton & Rose. (Fig. 13). Like the last, grows in clumps but less extensive with from 10 to 60 individuals or perhaps no more than 50-60 sq. cm., strongly attached against the rocks, each individual 4-10 cm. in diameter, flowers scarlet red, 3 cm. in diameter. Flowers and increases like *Opuntia floccosa*.

OENOTHERACEAE

Fuchsia macrantha Hook (Fig. 14). The indigenous "quechua" name "coacoa huayii" certainly alludes to its habit of growth, hanging down from the fissures of the rocks. Of the flora we are describing, it is the most outstandingly attractive. In the illustration one can see the character of its habit and



Fig. 19. *Salvia biflora*; Fig. 20. *Alonsoa acutifolia*; Fig. 21. *Bartsia gracilis*
(About $\frac{3}{4}$ natural size)

those of its flowers and leaves so that here I need give only the measurements of these parts—the blade of leaves 40-50 mm. long, 22-23 mm. wide, flower 56-60 mm. long, 12 mm. wide at the mouth, perianth red, slightly yellow tipped. Flowers from October to December.

Reproduction—Easily accomplished from the woody suckers, which are long, slender and membranous. Tubercles are produced, but these do not grow.

POLEMONIACEAE

Cantua buxifolia Juss. (Fig. 16). The national flower of Peru bound up with tradition and used in the ornaments of the ancient Peruvians who cultivated it and held it in great esteem as sacred and to be venerated. It is a shrub that reaches 2 or 3 m. in height, at the least, slender, much branched, the stalk woody, the leaves deciduous, these latter most variable in size and form, as one may see from the sketch accompanying the photo-

graph. Inflorescence corymbiform, pedicels 18-28 mm. long, with 2-3 deciduous bracts, calyx persistent, corolla dark red 70-75 mm. long, 9-11 mm. wide at the middle of the tube, 20-22 mm. wide at the mouth. Flowers at intervals of 2 or 3 months.

Reproduction—Seeds or cuttings. For the latter one should choose young shoots or twigs.

Cantua candelilla Brand (Fig. 15). In its general characters this species is the same as the preceding but the corolla is yellow and the stamen and stigma are more exserted. In these rocky cliffs there is a variety with reddish yellow flowers, probably a hybrid between *C. burifolia* and *C. candelilla*.

LABIATAE

Salvia biflora R. et P. (Fig. 19). This also is a flower much esteemed and venerated by the ancient Peruvians, considered sacred, commonly used as a decorative *motif* for their pottery, weaving, etc. From 30-45 cm. high—leaves and flowers as shown in illustration, which is natural size; color light red (there is also a rose-colored variety). Flowers abundantly from February to April, but when culti-

vated, in any time of the year.

Reproduction—Seeds.

SCROPHULARIACEAE

Calceolaria bartsifolia Wedd. (Fig. 18). 20-40 cm. high, stalks woody, Leaves almost sessile, about 7 mm. long and 3.5 mm. wide, inflorescence in racemes with opposite pedicles, 15-22 mm. long, corolla pale yellow, 9-12 mm. in diameter. Flowers from November to April.

Reproduction—Seeds.

Alonsoa acutifolia R. et P. (Fig. 20). 40-50 cm. high, woody, slender not more than 2.6 mm. in diameter, 4-sided, leaves opposite, slightly petiolate; corolla pale rose. Flowers from November to May; when cultivated at any time of year.

Reproduction—Seeds.

Bartsia gracilis Benth. (Fig. 21). 40-50 cm. high, stalk woody, much branched, leaves and flowers as shown in the photograph, petals of the upper lips red, of the lower, yellow. Fruit a capsule, seeds white, smooth. Flowers from December to May.

Reproduction—Seeds.

University of Cuzco,
Cuzco, Peru.

Memo Re Nomenclature of Lilies

1. For *valid species and botanical varieties* of the genus *Lilium* there are the Latin names accepted as conforming to the Rules of Botanical Nomenclature adopted by International Botanical Congresses. Except when applied to so-called "hybrid species" the names published in Index Kewensis are endorsed by the Lily Committee.

II. *Clones*. Many groups of lilies (*Lilium*) in cultivation are clones, each member of which has been derived by the repeated vegetative propagation of a single seedling. Such a seedling may be an outstanding variation within a species or it may be a plant of hybrid origin.

Thus far the clone has not been definitely distinguished from seed-producing varieties or even species in the rules formulated by either International Botanical Congresses or International Horticultural Congresses.

Rules have been formulated by Horticultural Congresses for the use of so-called "fancy names." At the last of these Congresses (1939) the Committee on nomenclature recommended that only fancy names be used for hybrids of horticultural origin.

When modified to apply to clones the rules, already adopted for fancy names, which are especially applicable to the names of clonal varieties of lilies are as follows:

1. A clone that remains true to vegetative propagation can bear but one valid name: somatic variations are to be given new clonal names.
2. The valid name is the earliest that conforms to the rules adopted.
3. The name of a clonal variety shall consist of a "fancy" name beginning with a capital letter.

(a) When a clone is a known hybrid or is of unknown parentage the fancy name may be combined with the genus name, as *Lilium* Golden King, or with the common name, as Lily Golden King. The use of a Latin proper name is hereafter not admissible for any new clone.

(b) When it is certain that a clone is an unusual member of a valid species the clonal name may be added to the correct name of that species.

4. A clonal name already in use should not be used again for another clone even though it be attached to a different species of *Lilium*.
5. Names that are likely to be confused with one another should be avoided.
6. The prefixes "Mr., Mrs., Miss, and Dr.," and the articles "a" and "the" should be avoided in bestowing clonal names.
7. The formation of a clonal name by combining the names or parts of the Latin names of two species that may be the parents is to be avoided; there can be many other different clones of the same parentage.
8. Existing names in common use should not be altered but may be converted into fancy names.
9. In order to be valid, a clonal name must be published in a language written in Roman characters in a recognized horticultural or botanical periodical, or in a monograph or other scientific publication, or in a dated horticultural catalog.

III. *The heterogen or polyploid*. A

group of hybrid lilies of common ancestry that is composed (1) of different individuals or clones or (2) of mixtures of seedlings and clones may collectively be referred to by a "fancy" name followed by the word "Hybrids," as—Backhouse Lily Hybrids.

IV. *Registration of names* for all clones and heterogens developed in America is advised. The Lily Committee of the National Horticultural Society will undertake to keep an accurate check list of such clones. Registration should be made prior to publi-

cation of the name, in order to avoid duplication of names.

V. *Nomenclature reviewed*. The only volume already published on lilies that lists the clones of *Lilium* and differentiates them from species is "Lilies for American Gardens" by George L. Slate. The Second Edition of *Standardized Plant Names* has adopted and somewhat extended this nomenclature, especially in the designation of new common names.

Preliminary Report of the
Nomenclature Committee,
Dr. A. B. Stout, *Chairman*.

The Illusive Ivy-VII

ALFRED BATES

For gardening purposes the true ivies—which, botanically, compose the genus *Hedera*—may be defined as weak stemmed climbing shrubs (vines) which always develop through two stages of growth: a juvenile or vining state and a mature or aborescent state. In the juvenile state the plant does not produce flowers or fruits; it has alternate leaves which are simple, usually five lobed, and a fan-like venation; climbs by means of aerial rootlets—root-like formations along its stem which function only as a means of attachment; and very freely sends out real roots from any point along the stem when the stem comes in contact with the soil. The mature state develops when the plant reaches, or almost reaches, the top of its support, at which time a very decided change takes place; the leaves become unlobed and thicker in texture; the stems become twiggy, more woody and the distance between leaves is much reduced; no aerial rootlets are produced and cuttings taken from this stage are very slow to send out true roots; and flowers and fruits are formed. The flowers are small, greenish and unattractive; they are arranged in a round umbel at the end of the twig, the umbel may be solitary or there may be several others springing from below the terminal one; the season of flowering is late in the year, seldom before October in the area about New York City. The fruit is a round berry which ripens during the winter and is quite attractive as almost every blossom produces fruit; according to species, the color is dark blue-purple, yellow or red-orange-white has also been reported as albinos of the blue-purple form. When cuttings

from the aborescent stage are rooted the resulting plants retain the mature manner of growth and fruiting.

PROBLEM OF ORIGIN

Tobler, in his monograph on the genus *Hedera*, gives a very plausible theory as to the origin and development of the genus. He surmises that long ages ago somewhere in northern India the parent of the genus as we know it today evolved from some near relative in the plant family which we now call *Araliaceæ*. Of that long distant past we have no record; but until man has developed some latent sense which will enable him to read the past history of a plant by holding a leaf in his hand we will be compelled to make guesses and draw conclusions. As this study is not a strictly scientific investigation but rather a horticultural handbook for gardeners we may indulge in a bit of imagination based upon what facts we know and the conclusions we may draw from them. Before developing our theory it will be well to cite Tobler's statements as translated from pages 4 and 5 of *Die Gattung Hedera* (The Genus *Hedera*) 1912; the translation of which has been kindly made by Mr. B. Y. Morrison.

"In evolutionary development it is possibly most reasonable to believe that the genus *Hedera* developed from *Gilibertia* and that genus from *Schefflera*. In plant distribution, the genus *Hedera* stands apart as more distinct than any other of the *Araliaceæ*." He then points out in a rather confused manner, that their center is in the tropics and that *Gilibertia* "spreads out in a few species but only to the north (China and Japan). In this northward direction *He-*

dera goes further and we may consider as most probable two directions of distribution and development: one out from India (where beside *Gilibertia*, occur many other relatives of *Hedera* particularly *Brassaiaopsis*) and one from China. From the Indian mountains the genus goes on but always northward to the Caucasus, the Black Sea and westward into the Mediterranean region. Here it makes a new center of distribution; and its development, part to the north and northwest shores of Africa and part to Europe in the north, goes on." One other quotation may be given here as it will shortly be used, "Several other *Araliaceae* have weak and (with the aid of root-like growths) climbing stems; the genus *Hedera* is the only one with aerial rootlets in all its species. In spite of this, the dimensions of its trunk may exceed those of bush- and tree-like growths."

With the above scientific backing I am presuming to visualize the first prototype of the ivy—note that I say *first* prototype, for the type had not yet been set—as it spreads northward until checked by the frigid climate of the higher Himalayas; so checked in its northward course, it (now firmly established as a fixed type) spreads eastward through China and into Japan and Formosa and westward across Persia, the Caucasus, the Black Sea area and into central Europe from whence it wandered north to the Baltic, west to the British Isles and south to the Mediterranean and into northern and northwestern Africa and out to the Canary Islands. How much of its travels was purely a natural development and how much was due to human introduction, especially throughout the Mediterranean area, is hard to say. Hard to say—because we, in spite of our modern cocksure attitude regard-

ing our investigations into the world's past, do *not* know everything regarding previous land formations, the speed of plant evolution nor the facts of plant usages among prehistoric cults and cultures. Many a plant may have been introduced throughout a wide area because it was held in reverence or considered sacred by migrating peoples; the white iris (*I. albicans*) is a modern example of this fact. So it may be that the spread, through the Mediterranean basin, of the ivy may not have been a natural one but through human agency; for we know that the yellow berried ivy was of sacred significance in the mysteries of Greece and of Egypt, and perhaps in even earlier cults of which even the tradition has been lost. This idea will be developed later on in the study for it may be possible that this yellow berried ivy now known as *H. poetarum* is, or rather was, a hybrid between the ivy of Europe and the red-orange berried ivy of India; the latter species having been brought into the eastern Mediterranean area and it itself died out long before Alexander conquered India. But we have wandered too far ahead both in time and space from the period when the theoretical and adventurous plant was striving in Hindustan to become the progenitor of the genus *Hedera*.

We cannot know from what plant that prototypical Adam of the race evolved; that plant or group of plants has long since passed into the limbo of forgotten things, as all stages of vegetable transition fade out when Nature has achieved the type more suited to endure. We may, however, hazard a guess as to what that long series of developments, from the first start—the cave man as it were—to the finished product as we know it today, was like. If we could only see that gradual evolution unroll before our eyes as a cine-

ma film we might be able to understand why the ivy of Europe sports into so many constant and inconstant forms and why color variegations are numerous only in the latest evolved additions in the group. While we are making guesses we may as well give free play to our imagination provided we start from scientific facts.

Might it not be possible that in this group of plants the memory of all its efforts to express itself, its long line of mutations and semi-mutations, is carried in the plant-consciousness of each member of the group? The word consciousness is used deliberately; there is no reason to think that plants do not possess consciousness of some kind: they respond to soil, exposure, weather vagaries—and who can say they do not respond to human affection for there are too many cottage gardeners who succeed with plants which are failures under the hands of the ostentatious gardener. It may be this memory of their native homes has become so ingrained into their consciousness that it prevents them from making the effort of striving to adapt themselves to new conditions. Science has not yet given the last word on this phase of plant life and may not for many years to come. Therefore, since this is not a strictly scientific paper, we shall indulge in quasi-theories and concede consciousness and memory to this group of plants which are so uniform in habit of growth and so bewilderingly perverse in foliage.

In our imagination let us endeavour to trace the development of the ivy from its first effort to make a separate genus until the prototype of that genus was established. It may have been a rapid change or it may have taken eons before the ultimate ivy became fixed—a set type definitely different from the plant from which it sprang and to which there was no longer a chance of

reversion. The first question which arises is, was its progenitor a shrub or a vine? If a shrub with a self-sustaining stem, how did it become a vine with a stem too weak to bear its own weight even when of greater diameter than many upright shrubs? If a vine, how and why did it acquire the habit of becoming twiggy and shrub-like when it reached the top of its support? Very few vines have this habit. May it not be that this arborescent or mature stage of growth is a return to its earlier form of structure? I am inclined to think that it is and that it evolved from a shrub because if it had developed from a definitely set vine it would surely have shown more "vine-like" characteristics; this point will be stressed later on.

Let us surmise that the first efforts toward the eventual ivy were in a densely wooded area where the young mutation had little chance to survive as a shrub because of the thick overgrowth; but yet had a rugged enough constitution to persist. The crowded growing conditions would explain a gradually weakened stem; but how did it reproduce itself unless at this period it fruited on the weak-stemmed growth? This memory—for it must have fruited then—may also be retained in the plant's consciousness for there is at least one form of the English ivy which bears fruiting spurs along a vining stem, even when creeping along the ground, and while the main stem continues on as a vine. It is easy to understand how a weakened stemmed plant would eventually become a vine; but it is not easy to understand why that resulting plant should not have spread southward as well as northward unless the original mutation had sprung from a plant with a complex which had already developed an aversion to heat. Tobler, surmising the ivy's progenitor evolved from some

plant in the genus *Gilibertia*, points out that that genus was wandering northward; therefore the aversion to heat and dryness may have become fixed even before our adventurous innovator started to establish a clan of its own. It may be noted here that even the ivy of North Africa grows only in the highlands along the coast where conditions are comparatively moist and temperate. Then too, no ivy chooses for itself a position in full sun; but when in its mature state, at the top of a wall or dead tree, it seems to welcome full sunshine. Therefore long ages in the shady and moist conditions of the forest must have set an indelible stamp upon the plant's consciousness for its youth; but in its maturity it expresses its natal desire for sun. So strong is the aversion to sun on its lower stem and root-run that when planted in such conditions it grows with shortened internodes to provide its own shade and old plants with mature tops will have vining shoots at their bases, unless shade is provided by other vegetation; whereas plants with northern exposure or in shady situations make little or no effort to shade their bases. Then too, in the juvenile stage the ivy will climb less readily when planted in full sun and even when it does climb its progress upward is much slower than when growing in shade.

Another point to wonder over is why and how it developed the short root-like processes by which it attaches itself to its support. Typical vines climb by twing around their support, by developing tendrils, or leafy tendrils, or by short tendril-like growths ending in a disc which adheres to the supporting medium; these are true vines and when tendril formations are made they are only at a node. Therefore the ivy did not adjust a tendril-formation into an aerial rootlet for these are formed between nodes. Very few other plants

climb by means of aerial rootlets and many of these are included in the *Araliaceae*; as cited above, "the genus *Hedera* is the only one with aerial rootlets in all its species." It is therefore reasonable to conclude that the ivy evolved from a plant of this group in which the production of aerial rootlets had become a settled factor. But how and why did this small group of plants retain this characteristic? There is only one answer; it found it perfectly suited to its needs.

AERIAL ROOTLETS

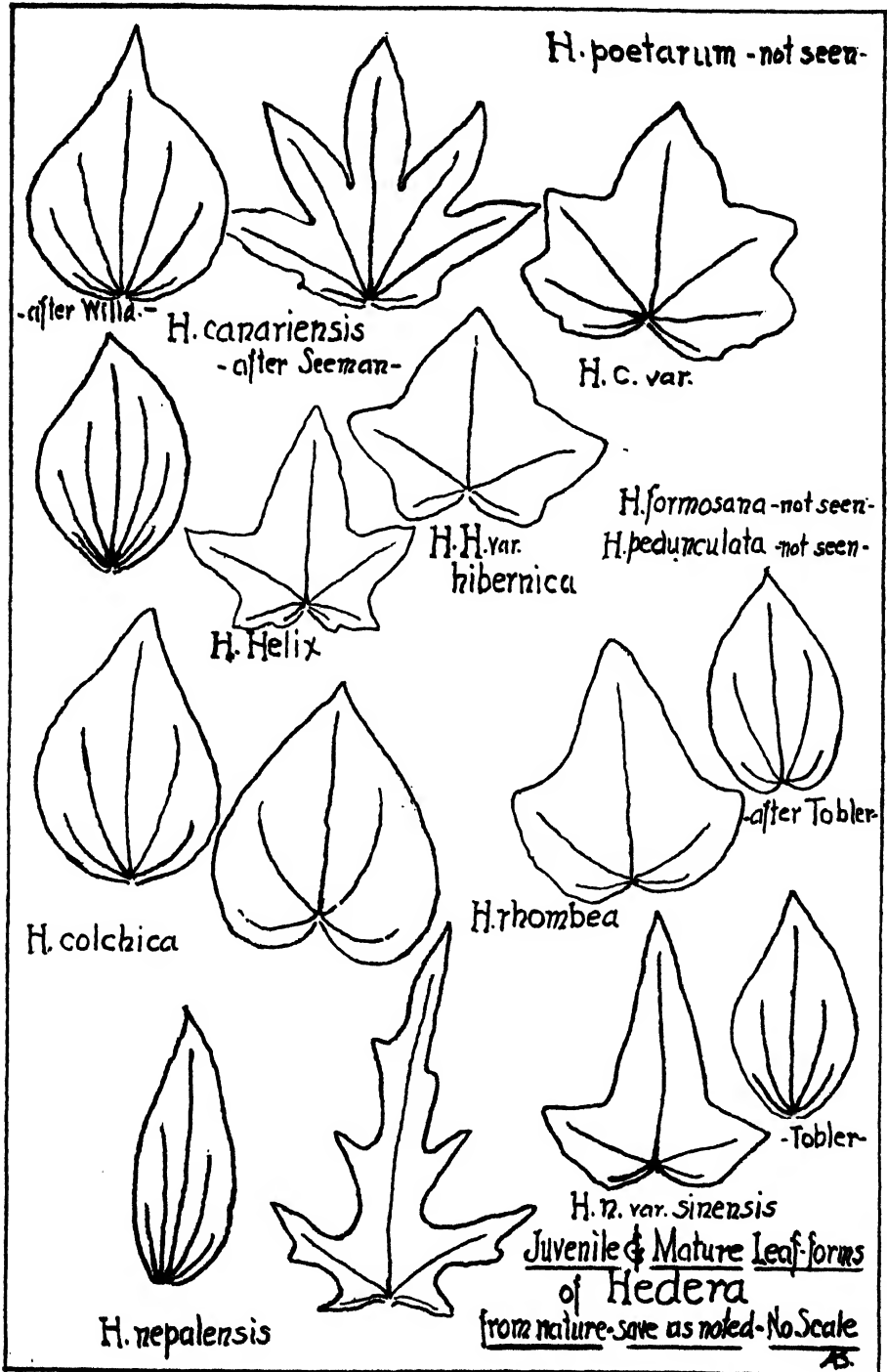
These aerial rootlets merely penetrate into the support, be it stone, brick, unpainted wood or bark, deeply enough to obtain a firm hold; they do not function in any sense as true roots for they do *not* absorb food from their support. In all probability they do absorb moisture, for a house wall covered with ivy is drier after the ivy has covered it than it was before; this, of course, may be partly due to the fact that the foliage both absorbs rain and sheds it off, but the consensus of opinion in England is that these aerial rootlets absorb moisture. That they do not absorb food is clearly proven by the fact that they do not penetrate through the bark of a tree into the sapwood; from my own observations they do not enter into their support for more than a scant eighth of an inch at most. And one may peel an old ivy from a wall or from a tree to prove this fact of shallow attachment. In the case of a tree, only the outer layer of bark will come off; in the case of a wall, nothing or only some tiny particles adhere to the rootlets. In fact, there are numerous cases on record in England of old ivies having acted as a protection to Gothic carvings; for those parts which were covered with ivy have been found to be in a far better state of preservation than those exposed to the weather. We

may therefore conclude that these aerial rootlets are not feeding roots and do not disintegrate masonry.

If, however, a shoot of the ivy is laid upon the ground when these aerial rootlets are beginning to appear, true roots very quickly are formed from among the cluster of embryonic aerial rootlets. One of two things may occur: either some of the embryonic aerial rootlets develop into true roots; or the plant sends out true roots through the aerial-root cluster more readily than from other parts of the stem. Writers on the subject are divided on this point; without taking either side I will merely state my observations. Cuttings with this aerial-root cluster in an early stage of development, when rooted in water where the process may be easily watched, *seem* to develop *some* of the embryonic aerial rootlets into true roots; the same phenomena occur when rooted in sand. When shoots which are still attached to the plant come in contact with the soil, either by chance or by intent, the same thing happens *if* these clusters are still in an early stage of development; and roots from the bare parts of the stem appear at a much later date. But if the aerial-root cluster is fully developed before the test is made, no true roots appear from that part of the stem. Then too, if a shoot is close enough to the soil to feel its dampness—not more than a quarter inch away—embryonic clusters will appear which seem to be drawn down to the soil and develop into, or send out, true roots even though the stem is not in contact with the earth; this may easily be observed in pot plants. Only microscopic daily observations would settle this point for it may be that the plant does not change the function of the embryonic aerial rootlets into true roots but, because that area has begun to develop activity, the plant finds it easier to pro-

duce its true roots at that point than from any other and when once the clustered formation has hardened the true root is no longer able to pierce through.

Continuing to develop our theory of the ivy's evolution we surmise that it started out as a shrub which because of crowded conditions in the forest was forced to grow with continually weaker stems until they were so weak that they could only creep along the ground. At this period it began, through the natural process of layering, to send out roots from along its stems; by so doing the plant found that it not only obtained more nourishment but could grow faster away from plant competition and so it developed the stem-rooting faculty to a phenomenal extent. As the plant grew along the ground, stems which came in contact with a tree or a stone tried to grow on such—the natural instinct of the plant being to ascend into more light and air in accordance with the upright habit of its progenitor. The dampness in the lower bark of the tree or in the stone near ground level induced the continued sending out of roots which found no nourishment or medium in which to develop; for a short space of time the shoot could continue growth upward by leaning against the support, but not for long as its own weight would topple it over and any breath of air would blow it down. But the plant made a very important discovery; when its roots could grow into a split in bark or rock that was deeper than usual those roots obtained some slight purchase which would hold the stem upright for a longer period. This discovery was very important to the plant for it had no parasitical heritage which might have been utilized in developing its stem roots into a strong and piercing process which would penetrate through the bark and into the stone in search of food but it suggested



to the plant that its stem-roots could be altered in their mechanism so as to be used merely as a supporting medium; thus merely using and amplifying an inherited tendency from its ancestor.

So the plant gradually developed some of its stem roots into aerial rootlets as that was more natural than acquiring an altogether new type of mechanism such as a parasitical root would be. It solved the problem economically by converting the energy, which would produce a long true root, into forming a large number of short aerial rootlets in a dense cluster and did not waste any energy in developing them any longer than necessary to obtain a hold, rather relying upon their number in mass formation; then it withdrew its sap from them and allowed them to become firm and dry. While their hold is shallow the mass formation is so strong that often in tearing a stem from its support the stem itself will split leaving a portion of itself still attached to the support. If the theory given above explains the formation of these aerial rootlets it does not solve the problem as to why the plant continues to send out these rootlets from all around the stem even after it has attached itself to a support. If one examines an old ivy one will find a perfect felt of dry and useless aerial rootlets covering the entire naked stem; the same observation may be made on old pot plants. This seemingly waste of energy is easily explained in a pot plant even when the stem has the support of a cane or wire upright for the natural habit of the plant is to grow against a tree or wall and so these rootlets are sent out from all parts of the stem in the effort to reach such a medium and attach itself to it. But with a plant that has attached itself to a wall or tree there seems to be no reason for its continuing the production of

superfluous means of attachment. Two ideas have suggested themselves, one sensible and the other quite fantastic: the plant may have found that this surplus of dried rootlets gave it an extra protection from cold or from gnawing animals—or that the plant was so pleased with its invention that it carried it to excess like a small boy who has just discovered he is able to whistle. After years of work with ivies I am almost convinced that this last suggestion is not as unscientific as it seems on first reading. Whatever reason the plant had for developing this dry felt of useless rootlets it saved the plant any expenditure of energy in the formation of a thick protective bark; for the covering over the sap wood, aside from this felt, is surprisingly thin in comparison with stems of similar diameter of other shrubs.

TYPE OF GROWTH

Why every species of the genus should follow the same pattern of so distinct a juvenile and a mature growth is another problem for the imagination to play with. Few other shrubs possess this quality in so distinct a form. Isolated species in several genera exist but no entire genus has so marked a difference of type of growth between juvenile and mature stages of development. This strongly individualistic trait showing how closely the plant's separate species follow the growth pattern of the prototype, points to two conclusions. First, that the genus developed in one place only, thus substantiating Tobler's theory, and so eliminates any theory of the plant having evolved simultaneously in several areas as may have been the case with some other genera such as *Rosa*, *Lilium*, *Rhododendron*. Second, that it existed in a small area where it was under the same conditions for so long a period that its growth pattern had become so firmly

fixed that it could not change it when it began to wander into foreign regions where it met with other conditions, such as open woods or dry climates.

So similar are the various species that botanists now use the arrangement of the small hairs on both the young growth and on the inflorescence as the final distinction between species. This hair-formation is too microscopic for the gardener to bother with until he has exhausted all other means of identification and we will use it only as a final court of appeal. Fortunately there is another mark of distinction, at least between definite species, which is easily recognized by the observing gardener; this is the shape of the leaf and the arrangement of its five main veins. This characteristic will be more fully discussed under the respective species but a few general observations must be made here.

VENATION

Tobler, in separating the genus from its near relatives, says on page 3, "*Hedera* always in the majority of the leaves, usually rather conspicuously, shows a fan-like, never a feather-like, venation." In a fan-like venation the main veins all branch out from the petiole at its junction with the blade of the leaf. The arrangement of the main veins forms the skeleton of the leaf formation and so governs its shape. In the ivy there are always *five* main veins—a strong central one and two pairs of lesser ones; sometimes the pair closest to the leaf base is abortive and hardly noticeable but careful examination will show them present, on the other hand some forms of the English ivy not only have the five veins strongly in evidence but have an extra and abortive pair still closer to the base. Now the difference in distance between veins—whether they are widely spaced like an open fan or closer together like

a partly open fan—governs the typical leaf shape of each species. In an open fan formation the pair of veins closest to the central vein branch out approximately at right angles to the central vein and the second pair are below them; they may extend straight out from the base or may curve toward the apex. In a partly open fan formation it is the second pair which is approximately at right angles to the central vein. These observations pertain to typical juvenile leaves; in the mature leaves the fan formation closes, that is the space between veins lessens, in all cases and in proportion to the type of fan formation of the juvenile leaf.

The drawings attempt to show relation between venation and shape in typical leaves of each species in both juvenile and mature stages.

RESUMÉ

Let us now sum up these semi-scientific conclusions. The progenitor of the ivy started out as a mutation from some member of the plant order now known as *Araliaceae* as a low growing shrub in northern India; because of competition with larger plant forms in the crowded forest where it was evolving it was forced to convert its stems into weak, long-reaching growths which soon acquired a habit of rooting as they grew, but continued to retain the desire to ascend; because of this fixed desire to grow in better light conditions it developed aerial roots in order to ascend to them; and while developing such rootlets it changed its leaf shape into a lobed formation following the plan of its main veins in order to lighten the foliage weight, to allow freer air circulation and yet retain as much leaf area for absorption of light and moisture as possible. (In massed foliage, a lobed or a compound leaf shape will allow the infiltration of light, sun and rain through the leafage more than

would an entire leaf of the same size.) It had, through its inheritance, a complex against heat and dryness and so ever moved northward toward the more moist and cooler conditions of the Himalayas; but did not have the stamina to adapt itself to the extreme cold of the higher levels of those mountains and so its migration was split into an eastern and a western branch. From its beginning in northern India, it persistently retained the memory of its original intention of being a low-growing shrub; and to accomplish that intent it developed the aerial rootlets so it could reach freer air and sunlight and grow as a twiggy shrub according to its original aim. (Arborescent forms will thrive in fuller sunshine than vining forms.) But it was so long defeated in attaining its original intent of being a shrubby plant that its enforced vining became a second nature, a fixed part of its life history, which it now cheerfully accepts.

Its present inordinate tendency to variety of leaf form, as shown in its more recently evolved species, may reflect its experiments with leaf-form in the dense and dimly lighted forests of its earlier life. It undoubtedly had to develop a tendency of adaptability in its childhood; and while the leaf form of our first ivy (*H. nepalensis*) has become fixed in its typical leaves (yet on a large plant one can find an indication of almost every other species-type) in its latest offshoot (*H. Helix*) the leaf forms are illusively Protean. Yet, while leaf shape changed bewilderingly, the type of growth (juvenile or vining and mature or shrubby) has been constant because it has become a fixed complex of its nature (perhaps the modern forms, *conglomerata* and *minima*, are compromises, there is no record of either having flowered). Its susceptibility to variegation may also be a reversion to effects of forest con-

ditions in the long past when there was not sufficient light for the plant to make enough chlorophyll for the entire leaf (in white forms) or sufficient food supply (in yellow forms). Such color variegations having long since died out in the earlier species but, being retained in the plant memory, coming into evidence again in its latest offspring; for most of our colored forms are in *H. Helix*, in its var. *hibernica* and in *canariensis* which may or may not be merely a variety of the English ivy. However, color forms may exist in the older established species which have not been recorded as existing in nature; no cultivated color form of *H. nepalensis* or its var. *sinensis* or any proven color form of *H. colchica* have been recorded and only one color form of *H. rhombea* is known.

OUTLINE OF SPECIES

We will now start with the first plant of the fully established genus *Hedera* and trace its gradual development as it wandered away from its first home in northern India and formed other species to the east and to the west of the Himalayas.

We know that first species which established the genus in its present state as *Hedera nepalensis*; in 1853 Karl Koch, a German botanist, gave it this name and described it. It may easily be recognized by its juvenile leaves which are pronouncedly different from all other species, being much longer than wide, of a decidedly grey-green with a narrow greyer band along the main veins, and of a thinner texture. A typical leaf consists of a long drawn-out central lobe with several secondary lobes along either side and two well defined lobes which appear to have secondary lobes near the leaf base but these are really small main lobes as the venation will clearly show; sometimes this second pair is so undeveloped as

to appear merely as notches as the base of the leaf. The venation follows a widely open fan with the first pair of veins set at about a right angle to the central vein and the second and much smaller pair set at a very acute angle to the first pair—and very close to the margin of the leaf. The mature leaf is long and narrow like a willow leaf for the venation has closed like a fan which is almost shut. The fruit is bright orange of rather a reddish tone.

This species is found throughout the whole of northern India and extends far to the east and to the west of its center. Taking first the eastern branch of its development we find that when it reached China a somewhat different type of foliage was evolved; but without sufficiently marked characteristics to be called a separate species. In 1912 Tobler called this form the var. *sincensis*. The typical juvenile leaf is similar to that of the species in color, grey band and texture but differs in that the long central lobe has no secondary lobing and the second pair of lobes is only infrequently suggested although the second pair of veins is almost always in evidence. The pattern of venation follows the type save that the lower pair is less pronounced. The mature leaf is wider and less willow-like for the fanshaped veining has not closed as much as in the type. The color of the fruit, which I have not seen, is as in the species.

Moving on eastward, the genus finally reached Korea and Japan, where it evolved a species which is rather similar to some forms of the English ivy. In 1846 P. F. von Siebold and J. G. Zuccarini gave it the name of *H. rhombica*, which Tobler disputes and has renamed as *H. japonica*; when we reach this species reasons for retaining the first name will be given. The typical juvenile leaf is definitely top-shaped—a strong, longish central lobe with a

pair of broad, shortish lobes and very seldom any suggestion of basal lobes although the basal main veins are usually present very close to the margin of the leaf. I am not certain of having seen the true type, and neither was Tobler; but the variegated form—commonly called “sub-marginata”—is quite common and from it, together with pictures of herbarium specimens and descriptions I have built up its characteristics which cannot be far wrong. The lobing is never deeply cut, the color is a bright dark green and the texture is thicker than in *nepalensis*. The venation is like an open fan with the two side veins almost straight across the base of the leaf and the second pair, when present, curving out below them and merely forming a heart-shaped leaf base. The mature leaves, which I have not seen, are long-ovate or roughly diamond-shaped-rhombic—because the venation has closed its fanshaped formation but not to the extent shown in *nepalensis*. The fruit is “black,” which means it is dark blue-purple and is larger than that of the common ivy. The hair formation is distinct and will be dealt with later.

From this species two others have developed which are but vaguely known and have never been seen by me. A Japanese botanist, T. Nakai, in 1924, gave them the names *H. H. pendiculata* and *formosana*. Tobler says they apparently differ very little from our species (*H. Helix*) and according to Nakai's diagnosis are stellate-haired.” They may merely be varieties or forms of the Korean ivy and until proven material is available for observation they will have to exist in name only.

The western branch of the genus did not develop, at least we have no records of such, a new center until it reached the Caucasus Mountains and the area around the Black Sea where

it founded a new species with another very definite leaf shape. In 1842 and 1859 Karl Koch gave, first as a variety of *Helix* and then as a species, the name *H. colchica*. The typical juvenile leaf seldom has even the slightest indication of lobing although in one form slight notches appear along the margin of the leaves; it is heart-shaped in outline, very large, deep dark green and of very thick texture. This species possesses one very pronounced characteristic which easily distinguishes it from all other ivies: when its leaves, either juvenile or mature, are crushed or are wet a sweet odor is given off. The venation follows the form of a partly closed fan; for the lowest pair of veins, no matter at whatever angle they start out from the base, always sweep out in a curve which eventually ascends toward the apex of the leaf and so forms the heart-shaped base which is characteristic of the species. In the mature leaf the venation follows the complex of the genus and closes its fan-like formation but not as much as in other species; this produces a leaf which is much wider than those of other ivies and is not unlike an aspen or poplar leaf save that its base is more wedge-shaped; it is also larger and thicker than the mature leaves of other ivies. The fruit is very dark blue-purple and is large. It also has another marked characteristic; the new growth is covered with a quite conspicuous downy mass of yellow or yellowish hairs. It is also the strongest growing of all ivies.

In the western part of the area where *H. colchica* predominates the genus begins to develop another species which as it travels westward spreads throughout practically the whole of Europe. In 1753 Linnæus gave it the name *H. Helix* and for almost a century it was the only species known to botanists. The typical ju-

venile leaf is deeply or shallowly five lobed with, in some forms, a fairly constant indication of two additional lobes; of deep green with a more or less pronounced cast of grey which often dulls the tone; of medium size in comparison with other species and of mediumly thick texture. The venation is in the form of a very widespread fan, especially so when the two additional basal lobes occur; which produces a leaf with an overall width approximately equaling its length; furthermore the veins are very prominent in that they are white or very light grey and "raised above the surface like a thread lain on." The mature leaves are ovate to elliptic with a rather long drawnout apex and a rounded base for the main veins close in more than would be expected from their very open formation in the juvenile leaf. The fruit is very dark blue-purple; but there are cases on record of forms which bear white berries.

Throughout the extreme western portions of the British Isles and of southwestern Spain and Portugal, where the mists of the Atlantic create a moist warm climate, the very versatile *H. Helix* has thrown off a larger leaved strong growing variety which may be in process of establishing itself as a distant species. Some botanists consider it so even now. In 1870 Karl Koch gave it the name *H. H. var. hibernica* although Kirchner in 1864 had given it specific rank as *H. hibernica*. The typical juvenile leaf is larger and coarser than the type; is of a yellowish green while young, becoming a deep blackish green as they grow older; is less deeply lobed; very seldom, if ever, develops an extra pair of lobes; is of thicker texture than in the type—I cannot understand why Tobler says they are thinner. The venation follows the plan of *Helix*, save for the extra pair of veins, but the

veins are yellowish green and not at all prominent. The mature leaf is larger and coarser than the type and is much more somber in color. The fruit is also larger but of the same dark blue-purple.

As that mighty wanderer—no one who has ever planted *H. Helix* in good soil and been compelled to leave the garden untended for even a year will deny that it is a wanderer, and if one pauses to compare that year's spread with what space it could cover in a thousand or ten thousand years one must concede it to be the Odysseus par excellence of the plant kingdom—as it traveled into northern Africa and out to the Canary-Azores-Madeira Islands (there must have once been a land connection) it established a very large leaved species which in 1808 was named *H. canariensis* by the German botanist K. L. Willdenow. At present there seems to be much confusion regarding the species itself, but not as to its varieties which are clearly defined but often taken for the species. Plants and specimen leaves received from England do not agree with each other nor with descriptions; descriptions in garden and botanical literature are equally at variance; and it is often confused with the Irish ivy. Tobler is not clear as to its juvenile leaf-form; Seeman gives a drawing of a sharply pointed and deeply lobed leaf as against all leaves received under that name which show extremely shallow lobing; and furthermore, the diagnosis of Willdenow is most unsatisfactory for he seems to have seen mature leaves only. Until we have the true plant it will be well to hold the depth of lobing in abeyance; but judging from the three varieties which I am sure of and which all show a uniformity in major characteristics, I feel justified in venturing the following description. The *typical* juvenile leaf is larger than *H. H. var.*

hibernica; is wider than its length; is five or seven lobed; of a brighter green and of a lighter and less waxy texture. The venation follows the plan of *Helix* even to the frequency of the extra pair of veins but the veins are never outstanding. Its most pronounced characteristic is the heavy light grey downiness on the young growth. The mature leaves, which I have not seen and rely upon herbarium specimens and descriptions, are larger and wider than in *Helix*, "thin" in texture and irregular in outline with a long drawnout apex. The fruit is large and "black."

Canariensis, at least in its varieties, seems to me to be closer to *hibernica* than to *Helix*, so much so that I am rather of the opinion that it evolved from the Irish ivy. This theory could only be proven if we could produce substantial evidence that the var. *hibernica* and not the species was the most predominant ivy in southern and southwestern Spain. But, if there is any justification for this theory, then how explain that an earlier mutation produced a mutation which acquired specific rank without itself becoming distinct enough (as yet) to gain that rank? Of course this all goes back to the perplexing question as to *just* what constitutes a species. In this case we may say that the grey-white felt on the new growth is the point of difference; size of leaf, difference in leaf-color, difference in leaf-shape and larger berries certainly are not enough to justify a species. These variations could all be accounted for by moisture, temperature and soil. So it may be possible that *canariensis* is not a species but merely a variety of *Helix*.

It is interesting to notice that the three largest leaved species are all native to quite similar growing conditions as to moisture, temperature and deep soil; and while increase in size resulted, in each case very different

characteristics were also evolved. In the heavy rainfall of the southern side of the Himalayas, in deep rich soil and a fairly genial climate *H. nepalensis* developed a rather large leaf which is much longer than wide, is deeply lobed and with many secondary lobes and of thin texture, and with a scale-like, but not very noticeable, hair-formation on the new growth. In the moist conditions around the Black Sea, in deep rich soil but a colder climate *H. colchica* evolved a large, thick, unlobed leaf which is fragrant and a rather dense yellow down on the new growth. In the constantly moist conditions, deep soil but very genial climate of the Atlantic islands *H. canariensis* produced a large leaf which is wider than long, more or less deeply lobed, of medium texture and with a very dense grey-white felt on the new growth. We could draw conclusions from these observations if we only knew more about the ivy which is said to be native to the moist warm climate and deep rich soil of Formosa—but even if we did, the evidence is broken for *H. rhombea* from the moisture laden air of Korea and Japan does not have a large leaf; but in this case it may be that this species inhabits the rocky, drier and colder mountains of both countries and that the semi-mythical *H. pedunculata* may yet produce the large foliage which will bolster up our theory. After all there is no

telling what an ivy may do, nor why it does it, nor when.

This leaves us with one "species" unaccounted for; and, as pointed out earlier, this may not have any claim to specific rank. In southern Italy, Greece and western Asia Minor (its existence as a native in Egypt is considered questionable) there is an ivy with yellow berries. In 1827 Bertolini, because of its yellow fruit considered it a species and because of its having been used to crown poets in classic times, gave it the name of *H. poetarum*. It may be that, or it may be merely a variety of *H. Helix*, or it may be a natural or man-made hybrid. So far I have been unable to locate any authentic juvenile plants and until I do there is no sense in repeating the vague and often conflicting descriptions given by various writers. Some years ago a large quantity of decidedly yellow berries was received from Athens but they were either picked too green or were too thoroughly sterilized during quarantine for not a seed germinated either with me or with any other person to whom shares were given. At present both the Brooklyn Botanic Garden and myself have small arborescent plants which are cuttings from an authentic "yellow berried" arborescent plant, fortunately made before it was lost "in the trade." Until these plants fruit and the seedlings grow into large enough specimens for observation comments upon this ivy will not be made.

Rock Garden Notes

ROBERT MONCURE, *Editor*

Bulbs Here and There

The flowers of *Iris reticulata* are probably more variable in the wild than is realized by most gardeners, who grow with great regularity either the deep purple type or the light blue "Cantab" form. It has not been my good fortune to wander in the haunts of the iris at its time of flowering, but late in the season somewhere in May I was climbing on Mt. Elwend, in northern Iran, and found unmistakable *Iris reticulata* in surprising plentitude. It grows on the steep stony slopes at about 10,000 feet above sea level in a loose sand, gritty soil. One digs it out in great tussocks, 50 or 100 bulbs strong, not to count the small bulbils with which it is so profuse. During most of the year these slopes are scorched dry, or covered deep in snow and it is just as the snow leaves, whilst the mountain sides are still wet that *Iris reticulata* flowers. The Persian forms of this species are constantly being collected and tried out in gardens, but somehow few but the two standard colors seem to remain.

Of this same fraternity is *Iris Bakeriana*, far less well known in gardens than *I. reticulata* and also possibly less widely distributed in nature. *I. Bakeriana* is rather narrower in flower than *I. reticulata*, a blue-purple, with white and golden markings at the base of the falls. Wandering over the limestone hills north of Marash, in central Asiatic Turkey, one day in late March, hunting for whatever might be of interest, we stumbled across a few lingering flowers of *I. Bakeriana*. It was the first time I had seen the plant. At well over 5,000 feet there was a broken

sloping pavement of huge limestone blocks, and the iris was growing in the thick black soil between these blocks. These little canyons were still cold and wet and a few yards away weeping drifts of snow lingered. The thin grass-like leaves of the iris waved in the chilly breeze. *I. Bakeriana*, unlike *I. reticulata*, did not appear to multiply greatly by division, for there were no dense tussocks of its slender leaves but single plants freely scattered over the whole area, as though the seeds spread easily and scattered far and wide.

Another of this delightful early group of irises is *histrioides* var. *aintabensis*. This has been long in cultivation and is far more dwarf than either *I. reticulata*, or *I. Bakeriana*. It is of a clear, light-blue, with yellow or orange on the base of the falls, and a few black or brown flecks over the yellow. It delights in a fat and heavy soil, far too gross for its dainty appearance. But, such is often the way of the most "fairy-like" flowers. On one of my earlier visits to Turkey we were staying with those most hospitable of people—the American missionaries—in the American Hospital at Gaziantep. It was through these good folks that we found the whereabouts of the lovely little iris. The Kara Tash (Black Rock) south of Aintep is a region of jumbled harsh, black rocks, which appear to have no lime in them. The soil thereabouts is a black-greasy clay in spring and almost cast-iron as the heat of summer advances. *I. aintabensis* has reproductive habits similar to those of *I. reticulata* and when found it is frequently in tussocks containing

large numbers of bulbs. Collecting *I. aintabensis* at the time when the foliage is dying and the seed ripe, the proper time to collect this plant, is extremely hard work, for the ground is already baked solid by then.

All over Turkey and Iran we were tantalized by stray plants of *Iris persica*. Except in the Taurus, where we were fortunate enough to find a most delightful bronzy form in flower, and in the open earthy slopes of western Armenia, somewhere between Sivas and Erzingan, where we found a rather curious "greenish-yellowery" form, I have not seen the plant in flower in the wild. There are a great many variations in colour and some have been given, if not specific, at least varietal rank. *Iris persica* does not appear to be in the least gregarious. One rarely finds a dozen plants within collecting distance of each other, so that it is difficult to be sure what one is garnering. The plant in all its forms is unmistakable with its pairs of deeply channelled grey leaves, lined with a brilliant silver edge. It is extremely difficult to collect really satisfactorily on 'account of the succulent, swollen roots which spread out from the base of the bulb and are essential to the health of the plant, yet they break off, with a facility most unwelcome, at the slightest touch. Also the plant usually grows in hot hard soil and roots to an incredible depth. But wherever one comes across it, it is always a temptation to try to get it up whole, for leaves alone are so very beautiful.

Whilst in the region of Gaziantep in south Turkey we found in many of the fields the lovely blue bells of *Ixiolirion montanum*. This appears to be somewhat larger than *I. Pallasii*. It grows everywhere over these limestone hills, but is most luxuriant in the cultivated plots and the vineyards where its narrow, dark-brown coated bulbs seem to

have gone down below the normal ploughing depth, and so to laugh at both cultivator and collector and produce great swaths of deep blue flowers on two foot stems every year, where crops should be flourishing.

Iran is often looked upon as the land of tulips. I had expected to find a good many species there. Either I was there at the wrong time or in the wrong places, for the number of species encountered was very small. Perhaps the most charming was *Tulipa polychroma*. In southern Iran, when visiting Lalhezar, I rode up from the tiny village where I had spent the night to the edge of the rapidly receding snows, and all through the lower reaches of that valley, in parched shingles and among a prickly tangle of *Astragalus* and *Acantholimon*, *T. polychroma* was exquisite. The flower, before it opens, is a slender, pointed cone, pink, often almost crimson, shaded slightly with a bluish green. It opens flatly to a six-pointed star of brilliant white, with a golden mark at the base of each petal, and a boss of golden anthers gathered around the pistil. The flower stem is rarely more than 8" tall and altogether it is a very desirable little plant. Further north, around Hamadan, we came across a few specimens of a delicate yellow form of this plant, but what became of them after they reached England I never heard. I fear they went to an early grave, the way of too many desirable collected plants.

Tulipa violacea will always be a prime favourite with me, bringing back my first sight of it in northern Iran. On an afternoon in early May, much later in the day than it should have been, I was scrambling toward the top of Mt. Elwend, just outside Hamadan. (As this was my first climb on that mountain I was determined to reach the top of its 12,800 feet.) I had started rather late and had skipped a good



E. K. Balls

Narcissus bulbocodium

many of the plants I had seen on my way up in order to reach the crest. I even indulged in the dangerous venture of a short cut over the scree at the foot of the final cliffs, making for a shoulder up which I could climb to the final top. It was in these steep coarse scree that, looking up towards my goal in order to get my direction, I saw, with the light shining through them, drops of a deep claret colour among the coarse and tumbled grey stone. The tulip was freely scattered among these upper scree between the rocks in a gritty sandy soil. But for the great depth of its rooting it would have been comparatively easy to collect. Above the ground it is a dwarf, less than 6 inches tall—a perfect delight. Later we found the same species on the high limestone scree of the Cilician Taurus in southern Turkey—just as dwarf and just as delightful.

It has seemed to me that, in one form or another, *Tulipa montana* is the most widespread species of that genus. I have stumbled across it all over the place, from southern Iran to northern Turkey. It usually likes a hot and dry exposure and not at any very great altitude, though in Cataonia it goes up to about 10,000 feet on Beirut Dag, in the form of *T. Wilsonii* (if my memory serves me rightly). It is to me one of those plants which do not appear "right" in the wild. The flaming scarlet cups, with their black basal markings outlined with yellow, are extremely handsome but somehow blatant among their more modest appearing companions. Not that I feel a good large scarlet flower necessarily out of place in the hills—in fact I am really very partial to *T. montana*—but it somehow seems wrong on a mountain side among rocks and cushion plants. It looks as though it belongs to a good fat garden border. Only in one place have I seen it flowering at all in profusion—at Kop

Dag, between Erzingan and Gumush Hane, in Turkish Armenia, where at about 5,000 feet the narrow valley was as gay with its scarlet as the Gumush Hane hillsides were with the crimson flowers of *Paeonia pubens*. In the limestone Taurus there grows about the most dwarf form of *T. montana*, the variety *Juliae*. This has the earmarks of *T. montana*, grey leaves crinkled at the edges and frequently edged with red, the same great glowing flowers, but a growth no more than 6 inches tall. *T. montana* var. *Juliae* is really very fine, and it is well that it does not appear to bloom at the same time as *T. violacea*, because the two colours would not be pleasant together, though the plants grow on the grey scree side by side.

Tulips almost immediately make me think of daffodils—why I cannot say! They do not always flower together and they don't even belong to the same family! The wild daffodils, however, are delightful and well worthwhile. Their distribution centers largely around Spain and North Africa. The widespread *N. bulbocodium* is the sole member I have actually met in flower in its native haunts, along stream sides in the parched Atlas mountains of southern Morocco (this is about its most southern limit, as it was on the southern slopes of this range almost within sight of the Sahara Desert). Those moist patches in such arid country are indeed surprising. The tiny streams will have a luscious band of turf and flowers, perhaps 18" broad on either side, and beyond all is spines, xerophytes and parched ground. In that moist band *N. bulbocodium* flourishes and flowers magnificently in June on the highest slopes.

My meeting with *Narcissus Watieri* was not one of those accidental pleasures. It was carefully prearranged and every precaution taken to be sure



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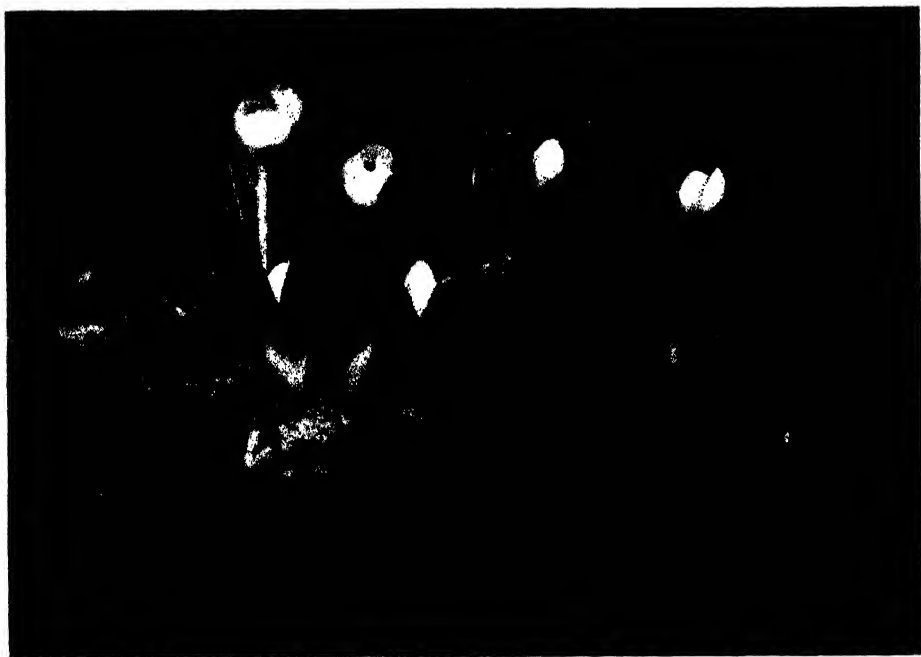
Narcissus Watieri

that we should not miss. At the time I was very much indebted to Mr. Jean Gattefosse of Casablanca, who helped me considerably during my visit to Morocco and travelled a good deal of the way with me. So, from Marrakesh we drove by car one day over a perfectly good road to the Tizin-n-Test, where, in scattered woods of evergreen oaks, we collected, from the sun-baked slopes, the bulbs of *N. Watieri*. It was not until the following spring, in my own Hertfordshire garden, that I saw the narcissus in flower and found it to be entirely entrancing. Its native home is rather interesting—*N. Watieri* appears to enjoy a really good summer baking. The live oak forests, where it grows, are not dense enough to shut out the sun from the steep coarse screes, and the narcissus prefers the sunny spaces between the trees. Here the slope is so steep and the snow so heavy that the surface is apparently constantly slipping, because most of the bulbs as we dug them were lying on their sides. They were warm as we lifted them out of the ground, and the old coats of many years cracked and readily dropped away, leaving a new golden brown sleek coat nearly as attractive as the flower when it came.

Crocus does not genuinely come under the heading of bulbs, but most of us associate them there. There are a few I have met of which I should certainly like to see more in cultivation. Perhaps the smaller species are not happy in cultivation, or are not showy enough; whatever the cause, one rarely sees them. Over half of Turkey, the central plain, *Crocus Danfordiae* is widespread. It has a wide range of colour with white, bluey-mauve and pale yellow as the chief points. The flowers are rather narrow, but often come up half a dozen together from one corm. In the early days of March the bleak and muddy heights above

Chankaya—the elite suburb of Ankara—are studded with this delightful little species, and also with *C. ancyrensis*—a species almost indistinguishable from the golden flowered *C. vitellinus*, except for the covering of the corm. They are both rather larger in flower than *C. Danfordiae* and vary in colour from golden-orange to a pale yellow. These two species spread almost the whole way across the country to the south and range in altitude between 3,000 and 6,000 feet.

In the northeast of Turkey there are some remarkable members of this genus. On our first visit to that part of the world my travelling companion, Dr. W. B. Gourlay, and I were quite delighted to come across the slender golden blooms of *Crocus Scharojani*, flowering in mid-August in the bogs of the high ranges. *C. Scharojani* and its mythical double, *C. Lazicus*, haunt the boggy spots of these Lazistan mountains from about 8,000 to 10,000 feet. The corms are tiny, about the size of a very small garden pea. In *C. Scharojani* they do not reproduce by offsets as is common in *Crocus* but instead produce enormous quantities of seed, which germinate and flower freely. *C. Lazicus* is said to be a stoloniferous species and should be interesting if one could find it! Numerous attempts have been made to grow *C. Scharojani* in cultivation, with only very limited success. Seed germinates readily and plants even continue for some years, but flowers are rather more than rare! In those same mountains the very last of the flowers of the alpine meadows is the dainty, cream-coloured *Crocus valicola*, with its varieties *Suvarowianus* and *lilacina*. These open in armies across the upper meadows just in time to be buried under the first of the winter snows, in the middle of September. *C. valicola*, which makes a corm almost an inch



E. K. Balls

Colchicum triphyllum

across, where grown in loose rich soil, around the villages, is dug by the peasants, boiled and used as a vegetable, but being mealy and a little insipid, is perhaps something like what a cross between a potato and a sweet chestnut might be.

Having brought one group of corms into the picture, it would hardly be fair to forget the *Fritillarias*, of which the Near East contains a great number. One of the earliest of my encounters in this genus was with *F. glauco-viridis* in southeast Turkey along a rough road between Adana and Gaziantep. In bright red clayey soil the *Fritillaria* pushed up its grey green spikes through dead leaves before the scrubby woods in which it was growing had begun to show any signs of life. *F. glauco-viridis* is a curiously attractive plant with narrow sharply pendant bells of soft grey-green on the outer

side and a vivid yellow-green inside. The stems are up to 12 inches tall and carry usually a single bell, though frequently have several. It is one of the earliest of these plants to flower, and in England it is usually kept in a frame or cold house on this account. Coming from an altitude of no more than 2,000 to 4,000 feet in southern Turkey, it is probably not very easy to accustom it to a climate with a wet cold vacillating spring. A real dwarf amongst this quaint group is *F. Graeca*, from the steep igneous screes of Mt. Smolica in northwest Greece. The slope was so sharp that it was difficult to climb about on it and every step seemed to set the whole surface of these fine black screes in motion. Here *F. Graeca* was nodding its deep brown-maroon coloured heads in hundreds an inch or two above the surface of the slope. It was here one of the easiest of plants to collect

and seems to be quite happy to have been collected by the comfortable way in which it settled back into cultivation. The twisted grey leaves of this plant are quite distinctive.

On steep slopes in a fine gritty soil in the burn ranges of the Great Atla, I came across in mid-July the dried tufts of foliage obviously belonging to a *Colchicum*. Scattered over the hillsides, these red-brown tussocks showed an abundant supply of the plant. For a *Colchicum*, collecting was easy. I garnered enough well ripened bulbs to assure at least some of the plant showing up the following year in cultivation. The plant turned out to be *Colchicum triphyllum*, one of the most attractive of the spring flowering species. It has an almost globular bloom of pale, slightly mauvish pink, darkened at the mouth of the corolla tube with a shading of purple. The anthers are dark olive-green, and the blooms will appear as many as six to a bulb, with the generosity common to *Colchicum*. Unfortunately, *C. triphyllum* has so far proved fleeting in cultivation either by reason of garden pests, such as slugs and mice, or by reason of short-lived tendency, inherent in the plant—in my personal experience the slugs got it first and very effectively.

A genus perhaps better known on this side of the Atlantic is *Zephyranthes*. The first of these I ever met in its native place was *Z. verecunda*, which seems to have quite a wide distribution in Central Mexico. We came across it on the old lava flow, the Pedregal, just outside Mexico City, and also in regions around the delightful little town of Tlaxcala. *Z. verecunda* varies considerably in form and colouring. In its best forms it is of a rosy apple-blossom loveliness with pure white and yellow inside—very attractive and desirable. This was the Tlaxcala form, though even it was not con-

stant. In its hard lava home on the Pedregal *Z. verecunda* was somewhat washed out, as though the effort of keeping alive in such harsh places was as much as it could manage. Unfortunately the finer forms collected around Tlaxcala do not appear to have maintained their superiority in cultivation.

Climbing upwards from the city of Quito (Ecuador) onto the slopes of Mt. Pichincha, there is a particularly steep cliff in one place, up which one scrambles and pulls oneself by means of various shrubs and lianes. Probably this is not the only place of its kind on those slopes, but it happened to be the place we chose to explore one hot day in the end of July. Emerging from the tangle of bushes, brambles and bamboos, we came out on a sloping ledge, matted with dried grasses and small shrubby growths. Though just past mid-winter—July in this part of the world—there can be some quite hot days! On this ledge spring was already advancing in a show of *Stenomeson aurantiacum*. This is a delightful species with drop-shaped flowers of a beautiful reddish orange colour. The individual bloom is about one inch to one and a half inches long and they are held in loose heads of three or four, each bloom on a slender drooping pedicel. These hang gracefully from the top of a slight, upright stem. The flowers appear whilst the bulb is still leafless, as is so often the case with members of the *Amaryllidaceae*. The *Stenomeson* is frankly gregarious and that gay ledge was well worth the strenuous climb for such a delightful sight. On a still less accessible ledge, just above the little slope of the *stenomeson* in a tangle of *Opuntia*, shrubby *Satureja stachyoides*, covered with its misty mauve flowers there was a single flowering stem of *Phaedranassa dubia*, another species of the *Amaryllidaceae*.



E. K. Balls

Zephyranthes verecunda
Tizatlan, Tlaxcala, Mexico

The *Phaedronassa* appears to be most unsociable, for whilst it is scattered over a fairly wide area one seldom sees any number in one place. The sandy slopes south of Ambato are perhaps as well furnished as any with its very attractive blooms. The bell is rather narrow, about $1\frac{1}{2}$ inches long and straight, slightly pendant and held in small umbels of up to half a dozen. In colour it is a rosy, coral red, tipped at the mouth with a pale, almost sea green. The stem is stouter than that of the *Stenomesson* and is about 18 inches to two feet tall. This plant is a real sun lover and it certainly enjoys a sharply drained location and soil. It grows in company with such sun lovers as *Satureja tomentosa*, whose orange scarlet flowers and aromatic leaves call loudly for sunshine and heat, and with *Mentzilia fendleriana* (an apricot flowered member of the South American family of *Loasaceae*), known locally as "pega ropa"

("stick to your clothes") on account of the clinging hairs with which the whole plant is covered.

The tropics also provide bulbous species, many of them particularly handsome but needing greenhouse treatment in cultivation. Approaching Guayaquil (Ecuador) by rail from Riobamba early in January we saw great drifts and swathes of white along the edges of the forest and in moist meadows which looked almost as though they might be bogs. The flowers were too far away to be distinguished as our train rumbled along, but it was not long before we were able to get a close acquaintance with *Leptochiton quitocnsis* (also known as *Pamea quitoensis*). Growing in masses along the edges of woods above the cemetery of Guayaquil, we collected through torrential rains, bulbs and specimens of this delightful plant. The flowers are about 6 inches across with a perianth marked by six green dividing veins. The six



E. K. Balls

Leptochiton quitoensis

Guayaquil, Ecuador, in woods and boggy meadows near sea level

outer sepals are narrow, about one inch wide, and protrude considerably beyond the perianth, giving a rather ragged effect when the blooms begin to fade. Leaves and flowers are produced simultaneously in great numbers in this warm and humid climate.

Further south along the west coast of South America are the famous *Amancaes* of Peru, also of the *Ama-*

ryllidaceae. *Hymenocallis amancaes* looks very much like a yellow counterpart of *Leptochiton quitoensis*, but its flowers are somewhat smaller and its leaves do not appear at the time of flowering. Also the *Hymenocallis* produces several flowers on a stem, whereas the *Leptochiton* has invariably only a single bloom. We were preparing to leave Lima on our northward journey,

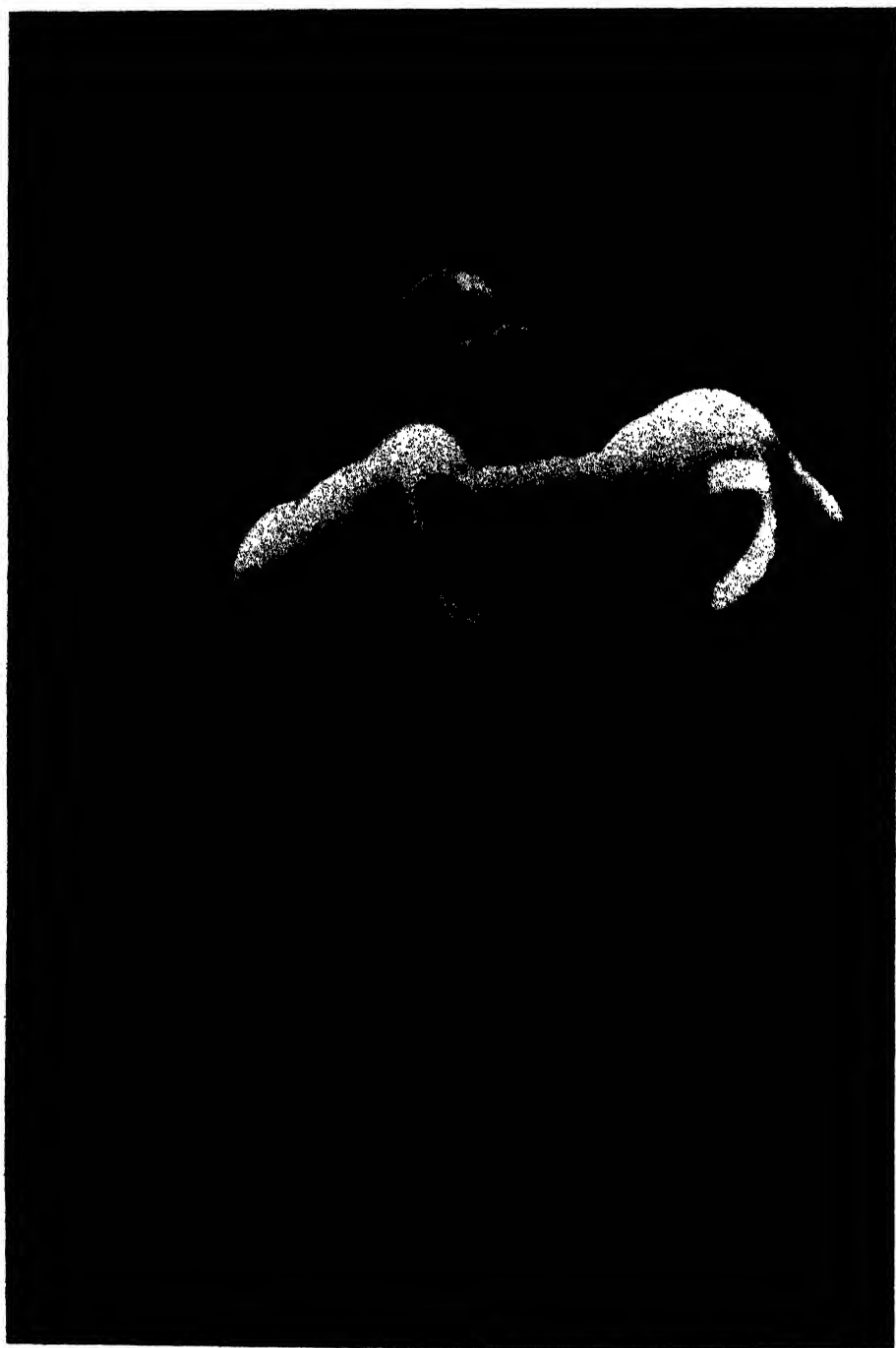


E. K. Balls

Lilium ponticum in the hills above Trebizond, N. E. Turkey

early in June, and hoped to have a few extra days in which to visit the surrounding country, which is mainly a very dry belt except for the summer fog season. However, shipping arrangements were suddenly altered and we were obliged to get away almost a week earlier than we intended, thus dashing our hopes of any study of the possible flora of these regions. We did succeed nevertheless in making a hurried visit to the Amancaes, by taxi one morning early! A drizzling rain set in as we started out and the roads were slippery as soon as we left the city. The view of the country through which we passed was completely shut out. Officially we were too early for the Amancaes but somehow, in one of those strange tricks of fate, the Amancaes were already flowering quite free-

ly in great patches over the desolate hills. Everyone had told us that it would be another week before the "daf-fodils" would be in bloom. But for straggling bushes of *Lycopersicum peruvianum* with bright yellow flowers, and little unripe green tomatoes, there was hardly another living plant on those hills. The Amancaes were growing in drifts among tumbled broken rocks and only in the rocky places. Their bulbs were deep down and wedged into the iron hard ground where the broken rocks went considerably below the surface. The moisture had not yet penetrated more than an inch or so of the top crust. It seemed surprising that these flowers were so soon awakened, when the moisture certainly had not yet reached down to their roots and this was the first genuine



E. K. Balls

Lilium ponticum

"fog" of the season. It was really more of a "Scotch mist" than a rain!

Perhaps just two of the lilies should come into these scattered notes. The first lily I ever saw growing in its own territory was *Lilium ponticum*. There is some doubt in certain quarters as to the veracity of this name. The species is in any case close to *L. Szowitzianum* and may possibly be the same, or a form of it. *L. ponticum*, as I first saw it, was growing happily in pine woods and on the edges of Oriental spruce forest among bracken, azalea and rhododendron, on the Pontic Hills, immediately behind Trebizond. It is to be found from 200 or 300 feet above sea level to the limit of the tree line at about 8,000 feet all the range, which seems to originate in the Russian Caucasus and runs westwards along the south coast of the Black Sea to fade out between Kerasun and Sivas. *Lilium ponticum* is a slender graceful plant growing up to 4 or 5 feet tall, and producing from one to four of its beautiful pale-yellow "turk's cap" blooms to a stem. The petals are flecked quite freely with deep maroon-coloured markings and the protruding

anthers are a deep mahogany colour with orange-coloured pollen when that is ripe. The whole of this region is moist and heavily forested, so that the acid soil is never dried out, and the lily flourishes all along these cool north slopes. It is delicately scented, rather in contrast to the strong heavy scent of *L. monadelphum*, which shares these hills with its fairer kin.

Later I came suddenly upon another lily, whilst wandering in Greece, *Lilium heldreichii*. This is a true "Turk's cap" with sealing-wax scarlet flowers, slightly smaller than those of *L. ponticum*. *L. heldreichii* was growing in dry, very dry, woodland country in open sunny spaces, where in spite of a heavy growth of bracken the soil was pretty well dried out. Both lilies seem to cling to the bracken association, and many of the lilies I have seen elsewhere also seem to do that, except for some of the forms of *L. monadelphum*, which climb up into the alpine turf in the Pontic ranges, well above either forests or bracken.

E. K. BALLS

Buckingham, Arlington, Virginia

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Alphonse Pericat's Azaleas

The year in which the compact, evergreen Kurume azaleas were introduced to U. S. is still a controversial question, but their enthusiastic reception and widespread planting from about 1920 on is a matter of common knowledge. One natural result was that a few men started crossing these excellent forcing varieties with other types of azaleas. Among these men was Alphonse Pericat, who made a great number of crosses, but who has received

too little recognition. He was a well-known florist in Collingdale, Pennsylvania, a suburb southwest of Philadelphia. In 1931 he exhibited a collection of his hybrids at the Philadelphia Flower Show. These received a great deal of favorable comment, but until recently little more was heard of his work by the horticultural world. Mr. Pericat continued his breeding and selection until his death only a few years ago, but the writer has been unable to obtain many of the details which the

horticultural historian would desire. It is therefore particularly hoped that this brief account will come to the attention of those who can fill in the blanks.

PARENTS USED

No records have been found which would indicate the parents used by Mr. Pericat in his crosses, so we cannot be certain as to their identity. However, the fact that the Pericat hybrids are intermediate between the tender so-called "Indian" or "Belgian" azaleas, which are mostly *R. Simsii* hybrids, and the Kurume azaleas, in hardiness, size of flower and leaf, and habit of growth, would indicate that these were the parents most used. Varieties exhibiting some of the qualities of Salmon Beauty, Pink Pearl, Flame, Triumph, Coral Bells, Hexe, Lorraine and Snow may be found among the hybrids. The fact that Mr. Pericat was primarily a greenhouse grower, who probably did very little with hardier varieties, would also suggest the "Indian" and Kurume groups as the most nattedetailed study of azalea heredity will be required before the parent varieties can be absolutely identified.

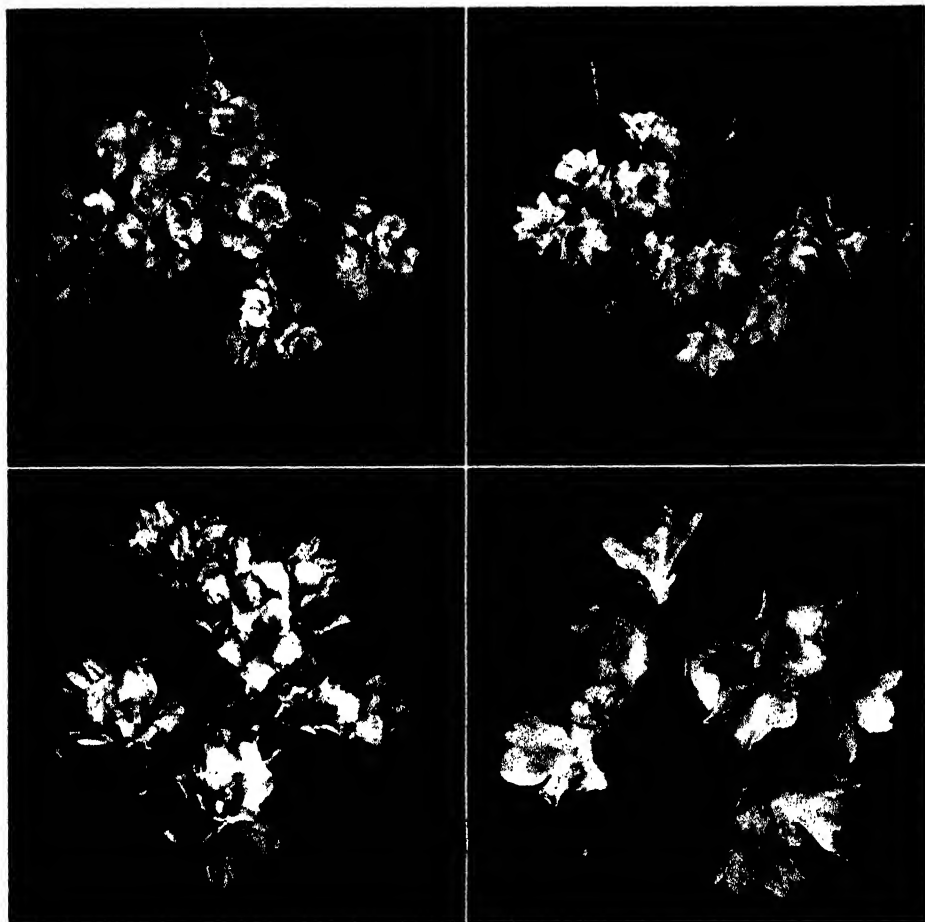
DISTRIBUTION

Mr. Pericat named and introduced himself only one variety—Madame Pericat. However, he sold his mixed and unnamed hybrids rather widely to nurserymen and florists as a result of the 1931 Flower Show, particularly to the Le-Mac Nurseries, Robert Craig and Company, Perkins-de Wilde Nurseries, and Leach's Nurseries. These nurseries grew Pericat's selections for a number of years, tested them in the field as well as in the greenhouse and each selected the most promising for his own purposes. As a result of this further work, at least a score of additional varieties have been named, beginning in 1935 when the Le-Mac

Nurseries named its group of eight. Furthermore, the nurseries named are continuing to work with other selections made by Mr. Pericat and we may expect the naming of at least a few more of these. However, it is possible that here are duplications in the names given some of the varieties, as there has been no coordination and little cooperation between the several concerns involved. It is also quite possible that additional varieties have been introduced without credit having been given to Mr. Pericat, or without coming to the attention of the writer. Some concerns, moreover, are still offering mixed plants simply as Pericat Azaleas and a few of the varieties described herein are not advertised as Pericat hybrids.

CHARACTERIZATION

As a group the Pericat Hybrids are somewhat tender but moderately strong growers, with a few exceptions reaching a height of at least four to five feet. The leaves are evergreen and are medium to large. The time of bloom at least in the open is mostly a few days to a week later than such varieties as Hinodegiri, although some growers maintain that they can be forced earlier than the Kurume varieties. The flowers cover a broad range of color, including white, pink, salmon, orange, orchid and lavender shades and include more attractive colors than are found in the Kurume azaleas. The blooms are generally either considerably larger than those of the Kurume group or very much more double; in a few varieties as Rival, they are both larger and more double. The amount of doubling is, however, quite variable between individual flowers of most of the varieties. It is of interest to note that at least some of the very double varieties such as Glory and Richesse are very compact and low growing. The Pericat



Pericat Azaleas: Symphony, Glory (upper):

Rhythm, Hampton Beauty (lower)

hybrids might in fact be divided into two groups on this basis, as it seems to be a clear-cut characteristic.

In the Norfolk, Virginia region, the Pericat Hybrid plants are perfectly hardy, but in exposed locations the flower buds are sometimes killed by winter temperatures. Farther north these varieties are usually brought into the greenhouse in the fall and treated like "Indian" azaleas.

The variety Hampton Rose is distinctly different from the rest of the

group in almost every way except color, as will be seen by referring to the description following. This would suggest that it may be pure Kurume or at least that it does not contain any "Indian" blood. This may also be the case with Gem. Although these two varieties were bred and distributed by Alphonse Pericat, it might be better not to include them as Pericat Hybrids because they do not possess the recognized characteristics of that group. However, for purposes of record they

are described and included in this paper.

PERICAT VARIETIES DESCRIBED

Where the dimensions of the flower are given, the width of the flower is given first and then the length, not including the flower stem. Hose-in-hose, of course, means two complete sets of five petals each, the outer usually being modified sepals. By triple is meant hose-in-hose plus a third set of five petals, the inner usually being modified stamens. Petaloid stamens are stamens which have been modified to become small or large petals; often the anther remains and is attached to the petal. Petaloid sepals are sepals which have been modified to become small or large petals.

China Seas: Rose pink flower. Single with petaloid stamens and sepals, all petals distinctly fringed, particularly the modified sepals, $2 \times 1\frac{1}{4}$ ". Can be forced for Christmas. Introduced by Leach 1937.

Dawn: Light pink, slightly violet on opening, nearly white in center. Flowers hose-in-hose, $2\frac{1}{2} \times 1\frac{3}{4}$ ". Early forcer. Very similar to the later Morning Glow. Introduced by Perkins-de Wilde 1939.

Fortune: Cerise red. Flowers hose-in-hose plus petaloid stamens, $2 \times 2\frac{1}{2}$ ". Early forcer. Introduced by Perkins-de Wilde 1939.

Gem: China pink. Flowers hose-in-hose, $1\frac{1}{4} \times 1$ ". Compact grower and early forcer. Similar to Salmon Beauty. Introduced by Perkins-de Wilde 1939.

Glory: Very rich reddish salmon. Flowers triple, $1\frac{3}{4} \times 1\frac{1}{4}$ ". Stamens mostly lacking. Plant low growing and compact. Introduced by Le-Mac 1941.

Hampton Beauty: Bright salmon pink with darker spots. Color mottled,

giving effect of apple blossoms. Flowers hose-in-hose, but outer petals are small and fringed, $2 \times 1\frac{1}{2}$ ". Vigorous grower and good forcer. Introduced by Le-Mac 1941.

Hampton Rose: Carmine pink with paler throat. Flowers hose-in-hose, $1\frac{1}{4} \times \frac{3}{4}$ ". Leaves small, plant low growing and compact. Earliest azalea in Kurume and Pericat groups to bloom in the open. Hardy as Hino-degiri. Introduced by Le-Mac in 1936.

Harmony: Clear rose pink with few faint darker spots. Flower hose-in-hose with occasional stamens slightly petaloid, $2\frac{1}{2} \times 1\frac{1}{4}$ ". Introduced by Le-Mac in 1941.

Hiawatha: Lavender pink. Flowers hose-in-hose, $2\frac{3}{4} \times 1\frac{3}{4}$ ", and outer petals somewhat fringed. Flowers hold well. Plant said to be hardy at Philadelphia. Sold to Wm. K. Harris, but introduced by Robert Craig Co. in 1942.

Flanders Field: Deep poppy red in color. Flowers single, large. Plant strong grower. Introduced by Leach 1938.

Madame Pericat: Light pink with shade of lavender, and greenish throat. Hose-in-hose to triple flowers, $2\frac{1}{2} \times 1\frac{3}{4}$ ". Probably identical with Morning Glow. Late forcer. Introduced by Alphonse Pericat.

Melody: Salmon with darker spots. Flowers hose-in-hose $2 \times 1\frac{1}{4}$ ". Introduced by Le-Mac 1941.

Morning Glow: Light pink, white center. Practically identical with Dawn, but later forcer, and possibly smaller flowered and darker in color. Probably identical with Madame Pericat. Introduced by Perkins-de Wilde 1939.

Orchid (No. 20): Lavender pink with darker spots. Flowers hose-in-hose, $2 \times 1\frac{1}{2}$ ". Said to be rather fragrant.

Medium forcer. Introduced by Perkins-de Wilde 1939.

Pride: Light red with darker spots. Flowers hose-in-hose $2 \times 1\frac{1}{4}$ ". Late forcer. Introduced by Perkins-de Wilde, 1939.

Rhythm: Rich, deep salmon suffused with orange and with prominent darker spots. Usually single with a few small petaloid stamens, some times hose-in-hose, but calyx always normal. $2\frac{1}{4} \times 1\frac{1}{2}$ ". Introduced by Le-Mac 1941.

Richesse: Salmon with somewhat darker spots. Flowers triple and stamens mostly missing, $1\frac{3}{4} \times 1\frac{1}{4}$ ". Introduced by Le-Mac 1941.

Rival: Light red. Flowers usually triple, sometimes with additional petaloid stamens, $2\frac{1}{4} \times 1\frac{1}{4}$ ". Good forcer. Introduced by Perkins-de Wilde 1939.

Splendor: Pink. Flowers hose-in-hose plus occasional petaloid stamens, $2\frac{1}{8} \times 1\frac{1}{8}$ ". Strong grower and late forcer. Introduced by Perkins-de Wilde 1939.

Sunset: Peach. Flowers triple plus petaloid stamens. Good early forcer. Rather upright in growth. Introduced by Perkins-de Wilde 1939.

Sweetheart: Carmine pink. Semi-double. Flowers $1\frac{3}{4}$ " across. Early forcer. Buds resemble Sweetheart rose. Introduced by Perkins-de Wilde 1939.

Sweetheart Supreme: Salmon pink. Flowers those-in-hose plus some petaloid stamens, $1\frac{3}{4} \times 1$ ", some outer petals fringed. Buds resemble Sweetheart rose. Introduced by Robert Craig Co. 1940.

Symphony: Rose pink with tinge of salmon; holds its color unusually well. Flowers hose-in-hose, $2\frac{1}{2} \times 1\frac{1}{2}$ ". Introduced by Le-Mac 141.

Twenty Grand: Bright rose pink. Flowers extra large, semi-double.

Strong grower. Introduced by Leach 1937.

The above descriptions have been submitted to the respective introducers, but as the experience with these varieties has been limited, the descriptions must be kept open for revision. Most of the varieties have been studied while in bloom, but in a few cases no plants were available and the descriptions were obtained from other growers.

THE PLACE OF THE PERICAT HYBRIDS

The particular adaptation of any new group of varieties must be determined by trial over a considerable period of time. At present it would seem that the Pericat Hybrid azaleas may be particularly valuable contributions to our list of eracaceous plants in three ways:

1. For landscape use in the middle and lower South. Relatively few Pericats have yet been planted outdoors, but our results at Hampton indicate that such varieties as Hampton Beauty and Hiawatha will prove very outstanding in the garden, at least in the Norfolk region, and certainly farther south. The plants have reached a height of four feet and promise to grow to perhaps ten feet under ideal conditions. They are more compact and evergreen than either the Kaempferi or Mucronatum (Ledifolia) types, and come in better colors and with much more double flowers.

2. For forcing in the greenhouse for Easter and for winter bloom. Several of the Pericats are distinct improvements over the present standard Kurume varieties in color, in size and in doubleness of flower. Their wide and rapidly increasing use by florists is certain.

3. In breeding new varieties which will be even greater improvements over present-day standards. The variability as to doubling indicates an unstable genetic constitution which may produce

particularly interesting results by selection as well as by hybridization.

Alphonse Pericat has passed on, but his magnificent azaleas will preserve his name for generations. And, even

after his name has been forgotten, some of his hybrids or their descendants will undoubtedly live on.

H. W. RIDGWAY

Hampton, Va.

A Book or Two

Ceanothus. Part I, *Ceanothus* for Gardens, Parks, and Roadsides, by Maunsell van Rensselaer. Part II, A Systematic Study of the Genus *Ceanothus*, by Howard E. McMinn. Santa Barbara Botanic Garden, Santa Barbara, California, 1942. 308 pages, illustrated.

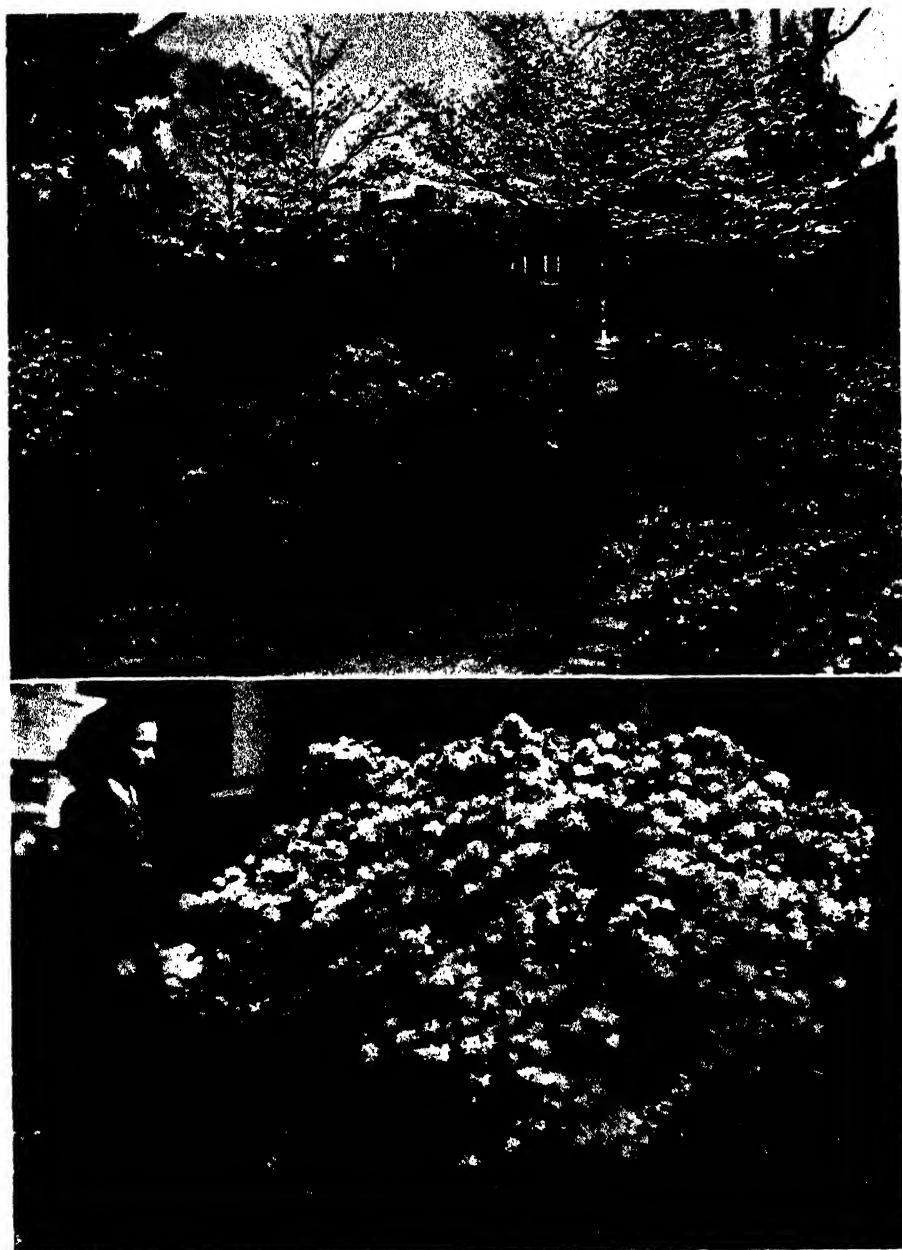
Ceanothus, like some other native American plants, have been highly prized by foreign horticulturists and somewhat neglected by Americans until recently. This book is doubtless the first important and comprehensive publication which deals with the group both from a horticultural and botanical standpoint. The book is written largely from the standpoint of utilization by gardeners on the Pacific Coast, but fortunately, descriptions and notes on hardiness are presented on certain hybrids, largely of French origin, which can be used advantageously in many parts of the eastern U. S. A. The illustrations and printing are above average quality, and the excellent line drawings of the leaf, flower and fruit of each of the numerous species should be helpful in identification. Keys are also furnished to aid in recognition of the various sorts. This work will doubtless stay on the reference shelves for a long time.

Chapters on propagation and culture and also on distribution and fossil history by other authors are included. The collaborative origin of the book

has led to a few oddities of organization and some duplication of material. For example, closely similar notes on plant size, geographical distribution, and certain external characters are found in the section devoted to horticultural notes and again in the portion devoted to taxonomy.

In general, the book is admirable for comprehensiveness but a few lacunae may be found. The notes on propagation could have been extended advantageously in a book apparently intended to aid in popularization of the plant group. Specialized methods of layering used in Europe might have been described, and the discussion on grafting could also have been extended. In our opinion, some nurserymen, at least in the East, may encounter difficulties in rooting cuttings of some of the hybrid forms developed in Europe, although apparently these sorts may be grown from cuttings with ease on the west coast. The behavior of plants with respect to propagation is often quite variable, depending on the climatic zone.

We hope that this book will arouse much popular interest in these valuable plant materials. Some forms of *Ceanothus* may be grown over a large portion of the North American Continent. Doubtless these are many unexploited possibilities in hybridization of this group. The abundant cytological information and the thoroughly modern methods of working out the relation-



*Garden of Miss Allie M. Fechtig, Wilmington, N. C.
Kurume Azalea, Pink Pearl, eight years old*

ships of the various forms used by the authors will doubtless be invaluable to those who attempt the production of new horticultural forms.

V. S.

Garden Easily. H. K. Morse. Charles Scribner's Sons, New York, 1942. 208 pages, illustrated. \$2.50.

It is evident that this book was not hastily compiled and it is also apparent that it must be based on the varied experience of the author. Certainly it is a happy coincidence that this book appeared at a time when all gardeners are so pressed for time and strength, and time seems forever nipping at their heels. Even the most avid collector-gardener has much to learn from this book and it is good discipline (it certainly is for the reviewer, who has been accused of having both an omnivorous and omnifarious horticultural appetite). Particularly pleasing and helpful is the introduction, "Garden Easily," followed by "Plotting and Planning for Ease." Other most helpful and interesting chapter headings are "Trees and Shrubs, the Gardener's Best Friends," "Perennials—Well Behaved and Handsome," and chapters on annuals, vines, easy roses, bulbs, water gardens, etc., and ending with "Short Cuts to Lessen Labor." This may seem like a large territory to cover in slightly less than two hundred pages, but the author has escaped being mediocre in selections and general coverage—recognizing the limitations of the book and not trying to name every possible plant shrub or tree, and avoiding the questionably hardy plants. For instance, she has included such things as the Serbian spruce (*Picea Omorika*), *Aesculus parviflora*, *Hippophae rhamnoides*, various flowering crabs, *Hydrangea petiolaris*, shrub roses and the hybrid Musk Rose, *Clytemnestra*, daylilies, Narcis-

sus, *Rhododendron carolinianum*, and warns gardeners to select only non-fruitletting or staminate forms of *Ginkgo biloba* to avoid the evil-smelling fruit. The book is both easy and interesting to read, and the few photographs are good, but it is unfortunate that they are so crowded on the pages.

R. C. M.

Herbertia. Published by the American Amaryllis Society, Orlando, Fla., 1941. 185 pages, illustrated. \$3.25.

Although this most interesting and worthwhile book is this year dedicated chiefly to daylilies, there is also most interesting and helpful material on narcissus and other amaryllids. Dr. Traub, Prof. Watkins and Mr. Hayward set up standard ratings for evaluation of the many new daylilies which are being thrust upon the market, which should immeasurably aid in bringing order out of chaos. Likewise there are reports from different parts of the country on the new introductions, as well as most helpful articles on breeding by Dr. Stout and Mr. Shull.

It is most encouraging to read the various English accounts and to know that there is still the will to carry on despite the severe bombing of some fine collections of amaryllids. The biographical notes on Mr. George Yeld, Mr. Amos Perry, Mr. G. P. Baker, Mr. Bertrand Farr and Mr. Hans Sass are particularly interesting both from the standpoint of history of daylily breeding as well as the interesting personal glimpses into the lives of those individuals. The many faceted character of Mr. George Yeld has always intrigued me—poet, scholar, teacher, alpinist and horticulturist—and in some details his life might be the prototype for the character of Mr. Chips.

Dr. Traub and the others associated with him deserve great commendation

for the publication of this yearbook in these trying times, and it is hoped that its publication can continue.

R. C. M.

The Care and Preservation of Cut Flowers, compiled by Marie L. Kelley for the San Francisco Garden Club. 1941. Second printing. 34 pages. \$.50.

This intriguing booklet is stimulating not only to the ardent flower arranger but to the amateur. He is made to lose his feeling of defeat and frustration, and to go at it again realizing that with a supply of hot water, peppercorns, three kinds of alcohol, and a few other things he can conquer almost any wilting flower.

There are special notes on California native plants and weeds. Ample space for notes is a challenge to experiment and collect recipes.

C. B. M.

1001 Garden Questions Answered, by Alfred Carl Hottes. A. T. De La Mare Company, New York, 1941. 386 pages. \$2.50.

A revised and enlarged edition of an old favorite, it has many improvements in text and illustrations. To answer clearly and in a practical manner the more than 1,001 questions of the normal gardener is an ambitious feat. Mr. Hottes does this well.

Among the additions are chapters on "Garden Accessories" and their construction, the improvement of plants through hybridization, "Garden Arithmetic," and a final one called "Monthly Reminders." This is divided according to the various sections of the country. It ends by quoting Karel Capek's unforgettable Gardener's Prayer.

C. B. M.

Cactus Culture. Ellen D. Schultz. Orange Judd Publishing Co., Inc., New York, 1942. 180 pages, illustrated. \$2.00.

This volume first appeared in 1932 and its reappearance now brings it to a gardening public which is far more aware than then of the subjects treated.

It is essentially a book for the amateur and probably chiefly for the beginner. It is lucid and forthright with enough infectious enthusiasm to solidify any vacillating interest and enough of sound counsel to make beginning easy.

A Handbook of Flower Show Judging. Sarah V. Coombs, for the National Council of State Garden Clubs, Inc. New York, 1942. 90 pages. \$1.00.

Flower shows in their innumerable forms have come to be a part of our national life. They rise and fall with the temper of the times and like other vital expressions alter their expression to fit the necessities of the times. Behind them, however, lies the force of our natural interest in plants and our growing belief in their importance in our national life. The diversity of this interest is reflected in this handbook.

To achieve the necessary completeness, it has been necessary to gather together here the several expressions of the various groups and organizations that have brought forward their own schedules for their particular groups, relating them to the common purpose and offering a modicum of sage counsel to those who may feel uncertain of their way.

To state the author's purpose nothing serves better than to quote the following paragraph:

"Garden clubs are formed for the purpose of encouraging gardening skill and knowledge in their members, an understanding of the *science* of horti-

culture. This should come first and be most important, but now that the world is coming to realize that flower arrangement is a true form of *art*, even though its handiwork is temporary, no one need be ashamed of an interest in that also. Those whose aim is the honored title of Accredited Judge should be well trained in both the science and the art, with an understanding of the many factors which make up successful flower shows and their judging. They must be judges of whom the National Council of State Garden Clubs may be proud if the title is to have the value which it should."

We commend it to all.

Modern Fruit Production. Joseph Harvey Gourley and Freeman Smith. Macmillan & Co., New York, N. Y., 1941. 579 pages, illustrated. \$4.50.

This book is a very concise though adequate review of the latest research work upon the principles involved in modern orchard practices. There are 17 chapters devoted to all the more important phases of fruit production. The space devoted to each topic seems proportionate to the magnitude of the problems involved. Each chapter is complete within itself, yet the chapters are so related to each other as to make the book as a whole well balanced. In addition to presenting the fundamental principles the authors have compiled the best modern practices in such a way as to enable the reader to understand why these practices have been adopted. The reader cannot help but be impressed with the progress that has been made in overcoming the difficulties of the fruit grower, yet he is also aware of the many problems that are still more or less unsolved, and because of which the reader may sometimes wish that the authors would come to a more

definite conclusion as to the practice that is most desirable. The book seems particularly designed for the student, enabling him to acquire a good knowledge of all phases of fruit production with a minimum of effort. On the other hand it brings to the veteran fruit grower the up-to-date information that he may not have had time to gather from the literature available or acquire otherwise.

C. W. C.

Try Growing Herbs—Manual for Experimenters. Compiled by Helen M. Whitman for the New York Unit, Herb Society of America. The Tool Shed Press, Bedford, N. Y. \$1.00

There are forty-seven subjects treated in this bulletin, described in alphabetical order on the left hand pages with an entry form on the right hand page to record the success or failure.

The data collected and offered are succinct and interesting but by no means uniform. No recommendations are given as to what parts of the United States would be best suited to the crop, although this may be inferred from the countries of original imports. No suggestions are given as to which plants involve the maximum of hand care in harvest nor are such suggestions as "Use-Cooking" very explicit. It must be recalled however, that the booklet is not intended to be the sole possession of the beginner who will have to know what he is about.

If one is to infer that the book is addressed chiefly to those who wish to grow herbs for their own use, some of the inclusions are curious; if it is to stimulate trade, more data on yields would be helpful, as well as some indication of the minimum quantity that can be sold to the dealer in medicinals or botanicals.

The Gardener's Pocketbook

THE MIDWEST HORTICULTURAL SOCIETY

Lilium michiganense

Although the taxonomists tell us that most of the wild lilies around here are not the old Turk's Cap (*L. superbum*) that it was supposed to be for so many years, yet most persons will still retain the old name.

In the wild this lily is encountered in prairies and under light shade of trees. It is decidedly not a woodland species. Generally it is found in grass and growing in loamy soils. The bulb is a scaly rhizome-like sort and is buried about ten inches below the surface.

The plant is easily transplanted and in cultivation does much better than in the wild. A light soil and a light shade on the soil such as would be given by grass or other low plants are ideal. Inasmuch as this lily is a summer blooming one it is a very desirable addition to the garden. Probably plants can be obtained in subdivided areas where their removal would be a definite act of conservation.

ELDRED E. GREEN

Cornus Mas

There are many species of *Cornus* or dogwood native to the middle western region. Many of these have entered into cultivation and have proven to be excellent subjects. The European species of *Cornus* are not so well known or are confused with closely similar native material. One of the old world dogwoods that has no native competitor is the Cornelian cherry (*Cornus Mas*). This species is either a shrub or a low round headed tree, depending on culture. While a neat, attractive shrub, during the summer it

has no special merit. In the early spring, though, this is unsurpassed for the quantities of small yellow flowers that literally cover the branches. Many people mistake this for a tall small flowered Forsythia, as the profusion of flowers and color does give much the same effect from a distance. Culturally this is less rampant than most of the shrubby dogwoods and is easily handled. While it grows well as a part of a shrub planting, it shows off best as a specimen where it can be seen during the early spring.

ELDRED E. GREEN

Fagus, the Beeches

The species of *Fagus* that are found in the Middle West in horticultural plantings are the native one (*F. americana*) and the European species commonly seen in the copperleaved variety. The American beech is a strikingly handsome tree with its distinctive smooth light gray bark and light green leaves resembling an elm in shape. In summer the foliage is a source of excellent shade and makes this a desirable shade tree for lawn of street work. In winter the gray bark is equally attractive, especially when contrasted with evergreens.

The beech is native over most parts of the middle western region and is found on both sand and clay soils. It is not a particularly easy subject to transplant and should be handled in the spring with a ball. Summer care for two or three years until the tree is well established will prove beneficial.

While recommendable as a specimen lawn tree, the beech can be used also for tall screens and hedges. The native beech is the one usually seen growing wild in woodlands. Occasionally specimens of the Copper Beech, a color

form of the European species, are seen. This is distinctive in the bronzy color of the leaves and requires similar treatment to the native one. Generally this would only be used as a specimen, as the material would have to be obtained from nurseries. Either one of the beeches would be something different and out-of-the-ordinary in most parts of this region.

ELDRED E. GREEN

Cabbage roses

Centuries have passed since the Cabbage rose (*Rosa centifolia*) was introduced into cultivation. While the ancient history of this rose is rather clouded by time, certainly the growth of this in the new world is rather well known. Introduced in various ways from the old world, the plants were grown and cherished and precious cuttings or divisions were given to relatives and friends. Gradually moving westward with the early settlers, this rose reached the Middle West and has found a permanent home in the old homesteads and country graveyards. In order plantings there is some confusion of the cabbage rose with other species. The cabbage rose is rather an erect growing bush with many flowers about 2-3 inches in diameter and many petalled. Colors range from pale pink through deep rose to white, the latter being least common. The cinnamon rose (*R. cinnamomea*) has slightly smaller flowers with arching weak stems and flowers that are only partially double and red in color. It is several days or a week earlier than the cabbage roses and is usually finishing its flowering when the other starts.

These two species with the numerous varieties of the cabbage rose and the Harison yellow constitute the majority of the old fashioned roses in this region. As sure, dependable bloomers they are unsurpassed. A minimum of care is

all that is necessary. Stock of a white cabbage rose was obtained from an old cemetery where it had survived utter lack of care for a half century. Similar instances can be repeated endlessly.

In garden use the old fashioned roses can be used for excellent background work in connection with a rose garden, or as components of the shrub border. Clumps as lawn specimens are often seen.

ELDRED E. GREEN

CORRECTION

It is a matter of very genuine regret that in the last issue of the magazine, the article on page 66, When Does *Lilium Catesbaei* Bloom, appeared without the name of the author.

This was written by Dr. Foreman G. McLean and our apologies are presented not only to our readers but to Dr. McLean for the oversight. It would be pleasant to be able to blame it to the war and its duties, but this is no excuse.

TO MEMBERS

It often happens that members write that they would like to send in notes for the magazine, but hesitate to do so without specific invitation. From time to time, we try to repeat in the magazine that the magazine is a mutual undertaking and that material is welcome from all members. We have only one rule that cannot be "bent." We do not accept poetry. What we should like most to have are pieces for the Gardener's Pocketbook, reduced to a minimum in this issue, but bulging a little for the next, pieces that will tell about plants that do well for you: with a note as to what they look like, how you treat them and how they reward you. What could be more simple?

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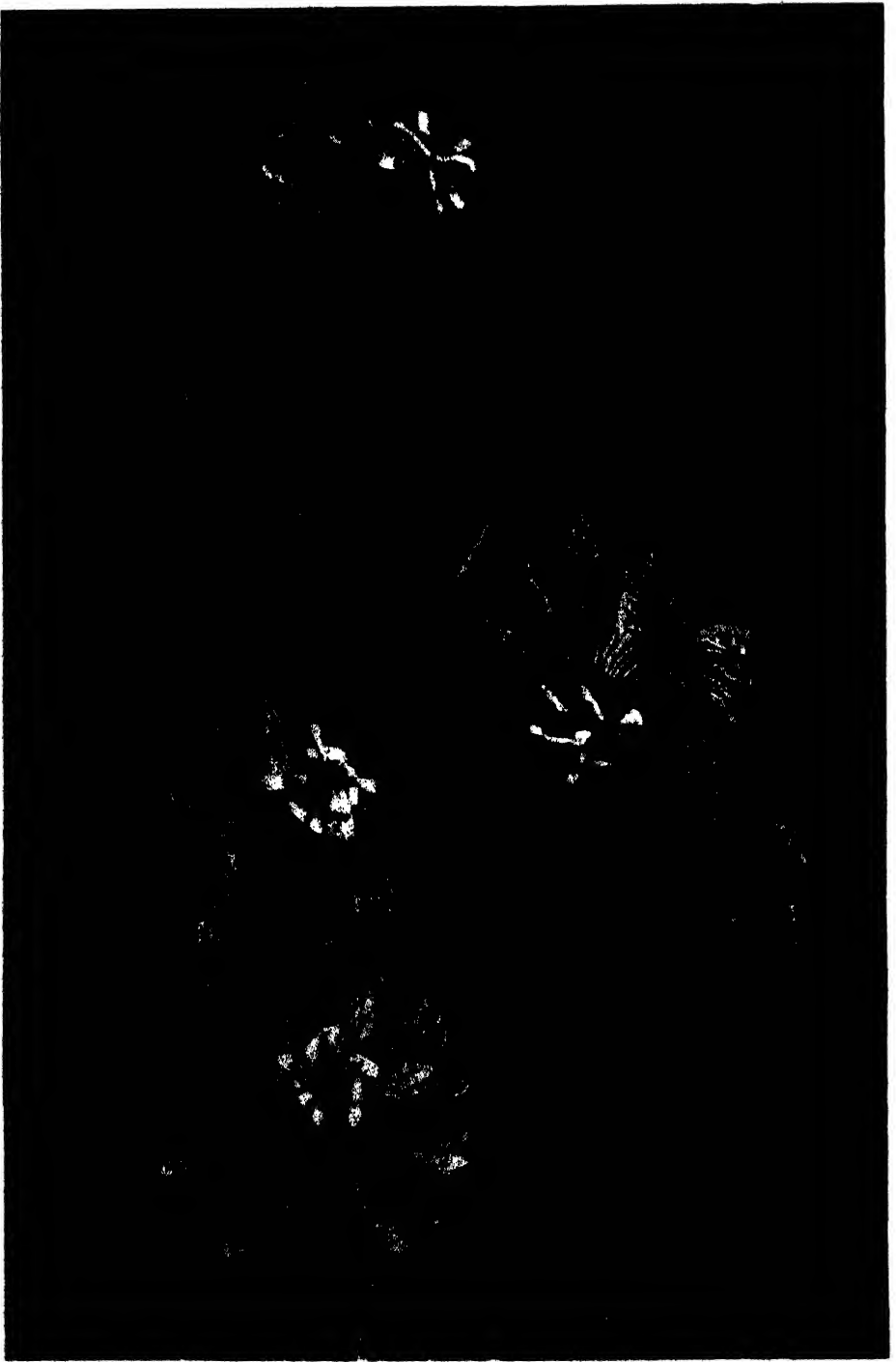
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Claude Hope

[See page 198]

Passiflora incarnata

Mrs. Christopher Columbus Discovers Key West

VIOLET NILES WALKER

Key West has long been the Mecca of the ardent fishermen, but until the building, first of Flagler's Florida East Coast Railroad, and later of the Overseas Highway, it was so difficult of access to the average traveller that its light was truly hidden under a bushel. Even the Railroad failed to immediately fulfill Flagler's dream of development, for the victims of Prohibition saw it only as the door-way to Havana's wide-open Alcoholic Heaven, and few tarried long enough to discover for themselves the unique quiet charm of the little Island. Little was realized of its colorful background to which pirates, wreckers, Cuban refugees, seafaring men from all nations, etc., etc., have contributed both historical and horticultural atmosphere.

But the completion of the Overseas Highway, built on the wreckage of the Railroad has changed the picture, and the world is beginning to realize the many-sided appeal of our southernmost city.

Particularly is this so in regard to plant lovers and gardeners. While artists, writers, naturalists, climate-seekers, and fishermen find their special interests fully satisfied, it is the amateur horticulturist who receives a genuine thrill at discovering for him or herself the tropical flora that is met on every side, and whose presence so close to home has never, curiously enough, been heralded even in the land of high-powered advertising which is Florida. The State Chamber of Commerce (as well as the city of Key West) has not overlooked the beauty of the Overseas Highway down the Florida Keys, with the fascinating vegetation of the Everglades framed by the brilliant colors of

sub-tropical seas. Nor does either miss a proper emphasis on the climatic advantages of the Island. But both have apparently failed to realize fully the appeal of the horticultural picture and its value as a drawing card to the little City.

The traveller entering Key West from the Highway, along the modern palm-bordered Roosevelt Boulevard (modelled on Havana's famous Malécon) is not prepared for the contrast between the low-growing vegetation of the Key and the great tropical trees lining the streets of the old part of the town. Mangroves, Sea Grapes, Beach Plums, *opoponax*, etc., with dwarfed flowering plants and beach vines which have held the scene for 158 miles, give way to a profusion of tropical growth whose size and development bespeak its long presence, yet of whose existence no previous hint has been received. And the question naturally arises "Why the silence?" Certainly few realize that Key West is the oldest settlement in southern Florida, and its streets were lined with established tropical trees, its homes and gardens adorned with shrubs, vines and plants of unparalleled beauty and luxuriant growth before Miami was thought of. It long ante-dates Coconut Grove, where Dr. Fairchild established the nucleus of the U. S. Plant introduction Garden around 1898.

The only answer can be the old adage "Familiarity breeds contempt," and that it has all been there so long, and has prospered so happily that it has lost its identity as a foreigner. A brief glance at the Key West explains this to some extent.

Key West has belonged to the

United States for only 120 years, and economically has undergone almost unequalled vicissitudes. Long before Flagler built his cherished Florida-East-Coast-to-Cuba Railroad, when communication with the mainland was only by slow water transportation, the Island City achieved a prosperity that made it at the time the richest city per capita in the United States, until a wave of sudden, overwhelming cataclysms completely reversed the picture.

Looking at it geographically, as we know, it is a tiny bit of coral rock lying at the tip end of the string of little coral islets which extend 120 miles southwest from the Florida mainland into the sub-tropics. It is about 5 degrees north of the Tropic of Cancer. The Straits of Florida and Gulf Stream on the east, and the Gulf of Mexico on the west exert a greater climatic influence than its actual latitude would indicate. Frost never occurs, and vegetation from the tropics flourishes side by side with the sub-tropical flora of the Keys and the rich Everglades.

We are told that southern Florida and the Keys were the last portion of the continent to emerge from the ocean, and it is interesting to note the gradual diminution of the soil deposit, none too deep for all of its richness, even on the Florida mainland, for at Key West there is an average layer of barely twelve inches of earth. Moreover, any water is brackish. Pure water from boring wells has never been obtained on the island, and the conservation of rain-water assumes the same importance for human life and vegetation that it does in the West Indies generally.

The Spanish discovery and domination of the West Indies and the southern end of the American continent naturally included the long string of islets now known as the Florida Keys. These were long uninhabited except for wandering tribes of Indians pushed further

south from the mainland by fiercer enemies of their own race, and all finally exterminated on the last island—whether by fighting or pestilence is not known. But the Spanish fishermen who first visited the island, finding great quantities of human bones, called it Cayo Hueso, or Bone Island, and curiously enough the English adaptation of the name correctly though quite incidentally describes the geographical position of the island, which lies at the extreme western end of the Keys.

In 1822 Spain ceded Florida and its islands to the United States, but shortly prior to that, in 1815, Cayo Hueso was given by the Spanish Governor of the West Indies to a Spanish Cavalry officer, Juan Pablo Salas, in recognition of services rendered the Spanish Crown. He took no interest in it, but an American from Mobile, John Simonton who had been ship-wrecked on a voyage from the Bahamas to Mobile fell in love with it, and after several efforts, finally succeeded in buying it from Salas for \$2,000.00. Thus it passed into American hands though still under Spanish rule.

From the time of their discovery in the XVIth century up to the early part of the XIXth, the Florida Keys had not been objects of colonization, chiefly because early in their history they had become the stronghold of the pirates, who, for over two hundred years were the terror of the Spanish Main. The numerous bays among the islands offered safe hiding-places from which to sally forth, and the intricate and dangerous channels afforded strong protection from the arm of the law. This, incidentally, was none too long, as the pirates paid tribute to the Spanish Crown, and enjoyed a care-free immunity in the successful pursuit of their trade.

At the time of investiture into the United States the Keys were still in-

fested by the pirates, known as the "Brethren of the Seas" and their depredations on shipping endangered not only the coastal trade from Mexico and Cuba, but rendered unsafe further colonization or commercial development which the geographical position of the island offered.

All efforts to dislodge these unwelcome neighbors failed, till Commodore David Porter ingeniously and effectively exterminated them. He realized that the frequent failures were due to the difference in size and type of ships employed, since the Navy frigates, with their depth of draft were unable to penetrate into the shallow waters, and the pirates in their light draft rapid sailboats could easily elude their pursuers. So Porter discarded the useless larger frigates and assembled a fleet consisting of eight small-draft schooners and five twenty-oared barges, naming these last after the little stinging insects of the tropics—Gnat, Mosquito, Gallinipper, Midge and Sandfly. He imported a steam ferry-boat from New York (and incidentally this was the first steam vessel used in our Navy), named it the Sea Gull, and towed the barges in pursuit of the Brethren. They were caught up with, Porter unloosed his towing fleet, and chasing the pirates into their lairs, soon wiped them out. The last remaining contingent took refuge in the harbor of Fajardo, Isle of Pines, and were burned out under the very eyes of the Spanish garrison who, remembering the fat tribute they paid to the crown, had refused to give them up.

With the terror of piracy removed, the little island immediately became the objective of a heterogeneous mixture of settlers from all over the world, and the town, laid out in 1829, grew rapidly and prospered phenomenally. The early lucrative wrecking business laid the foundations for greater wealth and

this was followed by the building up of a flourishing trade in sponges, fish, turtles, salt, tropical fruit (especially the canning of pineapples) to which was added the manufacture of cigars when political refugees from Cuba brought their factories from Havana; and an era of unparalleled prosperity ensued.

With the realization of Flagler's dream of the Railroad came added prosperity, and it looked as though the fortunes of Key West were on a fabulous up and up. But suddenly the tide turned. Labor troubles and unreasonable Union demands caused the owners of cigar factories to seek new methods, and with the discovery that modern science could produce elsewhere the same atmospheric conditions as had been thought possible only in Cuba and Key West, the factories were quietly removed, some to Tampa, some to Connecticut. Congress passed a tariff law which shut out the pineapples from the West Indies and killed the canning trade, and a little later disease appeared among the sponges; and finally the hurricane of 1935, with its frightful tidal wave swept out great sections of the Railroad with enormous loss of life, including the camp of 3,000 American Legionnaires at Mitacumbe Key. And the glory that was Rome's departed. Since then Key West has lived on Government aid, and though a small group of representative citizens are struggling manfully to help the city help itself, many of the projects planned before present war conditions must be delayed to the future.

Architecturally, Key West is a mixture of types. The earlier homes follow the beautifully simple lines found in the Bahamas or Cuba, with sloping roofs, galleried second stories, high ceilings, solid shuttered windows. Many have outside stairs to the second story. The Victorian era left its mark with many

more-pretentious houses, while the modern trend is toward low spreading types. The array of small, and for the most part unpainted wooden homes of the Cuban, Mestizo and colored population, are built back from the street, and follow an almost uniform pattern, each with its little front porch, smothered in vines, and its little front yard generally a tangle of tropical plants.

The architecture is soon forgotten in the bewildering variety of shrubs, vines and plants, and soon one realizes the value of the soft grey tones as a background for the gorgeous tropical vegetation, and the brilliancy of the tropical skies. Small wonder that Key West attracts artists from all over the country.

The first stroll among the little narrow crooked streets and by-lanes with their sudden blind ends, is a thrilling voyage of discovery to the visiting stranger of horticultural bent. Here and there, amid the profusion of tropical growth, almost fantastically unreal, familiar friends can be recognized as green house subjects or as summer annuals in northern latitudes, or a plant may be identified from some remembered past study or picture. But for the most part it is all bewilderingly new, and small satisfaction is gained by enquiries among the Cuban or Mestizo residents, who can furnish numerous pet names, but none that offer any dependable clew to the family name of the subject.

As one passes a vacant corner lot, a flash of brilliant cobalt blue catches the eye; closer inspection shows the entire lot covered with a tumbling mass of vines bearing that most glorious blue of any flower—*Clitoria ternatea*, native to the Molucca Islands, occasionally grown in our gardens as an annual. To the Cuban it is "The Blue Pea." Fences are smothered in the spectacular *Senec-*

io scandens, from China, with its masses of brilliant orange bloom, and known only as "Mexican Love Vine." "Heart Flower" is variously applied to several plants, but notably to *Antigonon leptopus* (*Rosa de Montana* or *corallita*) which runs riot even in vacant lots. "Spider Plant," "Orchid Tree," "Slipper Plant," "Cigar Plant," "Tulip Tree," etc., etc., give no hint as to their family pedigree, and when the Cuban imagination gives out it is "some wild flower" or, more expressive still, "Just a flower."

Wild flowers share the same oblivion. Wandering over the sands of the abandoned salt flats, or around the old brick Civil War fort, East Martello Towers, a glossy-leaved evergreen vine bears stunning wide-open cups of fine purplish-violet; along the roadside is found a slender glaucous leaved plant, about 8 inches high, with fringed blue-purple flowers closely resembling our fringed gentians; and a tall shrub, with evergreen foliage is smothered in clusters of tiny brown fluffy balls, intensely fragrant . . . none of these known, apparently, to anyone.

It must be borne in mind that the casual visitor, however flower-minded, is not always a botanist, and therefore the search for information must be directed somewhere . . . but where? A small survey of existing plant material, made in 1933 can be unearthed from the Chamber of Commerce, if the visitor has the bright idea of applying there. As far as it goes, this is helpful, for it gives the locations where the plants can be found; but it mentions an amazingly small percent of the tropical vegetation so evidently long-established, that can be run down by even the rankest amateur in a short sojourn.

Poinsettias furnish the first thrill. Accustomed as we are to the 2-3-foot potted Christmas specimens, the hundreds of great shrubs from 10 to 15

feet tall (as high as some of the little houses), literally smothered in the brilliant scarlet "flowers" are eye-opening; and when the glistening purity of a white variety is stumbled on in a tiny front yard, or a peep into a back garden discovers an indescribably lovely creamy-pink tone, that visitor "is off" for all time. And what a field for adventuring! For, unlike the combed and brushed aspect of Miami, where every exotic plant is named, nursed with care and kept within bounds on the sophisticated estates, in Key West the rarest tropical plants have escaped from their original homes and without respect to rank or person run riot in the poorest little yard, or even waste places. A street lot, left untouched for any length of time, becomes a tangle of native and exotic material . . . *Crinum*s, *saunderias*, *thunbergias*, *bougainvilleas*, *hibiscus*, *opoponax*, *poincianas*, etc., etc. Seedlings of what to us are rare flowers can be pulled up along the neglected side-walks.

As one becomes familiar with the physical conditions, i.e., the lack of fresh water and the shallowness of the soil, wonder grows at the enormous development of the street trees, so obviously of foreign origin, together with the huge boles of flowering vines which also bespeak their long establishment. The answer given these two questions seems to be, first the ease with which the depth of soil can be increased, since the richest compost can be made from decayed vegetation and rotted fish in an incredibly short time. And second, trees that cannot stand the brackish water do not flourish. Few are found having tap roots. Added to this, it is said that the roots of the trees penetrate the soft coral rock by means of an acidity which they develop, which disintegrates the rock and provides deep root runs.

No record seems to have been kept

of what was brought to the little settlement in its early days, but ornamental trees and shrubs must have come practically with the first permanent residents. Today pages could be devoted to the trees alone (instead of only a few words), for from Burma, Australia, Southern Asia, Africa, tropical America, etc., have come the superb specimens shading the wide streets.

To mention but a few of the longest established. *Ficus religiosa*, or Pee-pul tree, the sacred tree of India is one of the largest on the Island, though possibly the palm for size and beauty goes to an enormous *Ficus retusa* (called locally the Alexandrian or Spanish Laurel) whose branches spread entirely across the street. The beautiful feathery African *tamarind* thrives, strangely enough in the shallow soil, growing to 70 feet in some of the home lawns. There are many large specimens of the curious Sand Box or Monkey Dinner-Bell tree (*Hura crepitans*) whose trunks bristle with spines, and whose seed capsules, when ripe, explode with a loud noise.

Another showy tree whose trunk and limbs are covered with countless black thorns is *Erythrina indica*, the Lenten Tree, with brilliant red 3-4-inch blossoms appearing profusely before the leaves making a huge scarlet blotch on the landscape. *Pithecellobium dulce*, the Rain Tree, has long twisted reddish pods opening to show the 1/2-inch balls of snowy white pulp covering the seeds. *Spathodea campanulata* is one of the most spectacular bloomers, with 6-inch orange flowers in 15-inch clusters. *Bauhinia*, the Orchid Tree is a tropical cousin of our Judas Tree, showing it in the foliage, and with orchid-like lavender or white flowers in late winter. *Gliricidea*, whose cream and pinkish lavender pea-like flowers hang in racemes like wisteria, blooms before the new leaves; *Moringa moringa*, the

Horse-radish Tree, with distinguished pinnate foliage and clusters of fragrant waxy blooms resembling horse radish in taste, furnishes flavor to Key West salads. And the *ceiba*, or Kapok tree is a sensational mass of soft pink bloom up to the end of January, agricultural bulletins to the contrary, who list it as summer blooming; while its great winged trunks are among arboreal curiosities.

In recent street developments, *Schinus terebenthifolia*, the Brazilian pepper (a close relative of the California variety), *Casuarina equisetifolia*, Australian Pine and *Swietenia mahogani*, Mahogany Tree, have been widely planted as shade trees. Just to list a few among the many strange specimens sounds like a guide book to the great tropics . . . *Quassia amara*, or *samaruba*; *lignum vitae*; *Terminalia* (the African almond) *Annona squamosa*; *Aralia chinense*; *sapodilla*; *pomegranate*; *papaya*; *mango*; *Ficus elastica*; *Jacaranda*; *Kigelia*; *Lucuma mammosa*, and so on, *ad infinitum*.

Vines are superlative, from the delicate and fragrant jasmines including the white, richly-fragrant night-blooming *Cestrum nocturnum*, to *Thunbergias* in every shade of purple to blue, as well as the deliciously scented white *Thunbergia fragrans*. The yellow *Allamanda*; the great cream trumpets of *Solandra guttata* (the Chalice flower) which seem out of all proportion to the little porches which they completely envelope; the *bougainvilleas* in all colors. *Pandorea ricasoliana*, with its clusters of great widely-flaring, fluted clear pink cups, heavily spotted with deeper tones of the same color is used as a high climber, or trained low over stone walls giving the effect of a pink hedge. *Monstera deliciosa*, or *ceriman*, that giant among tropical vines, with its unbelievable 18-inch white "calla lily" blooms, its huge fruit and the great leaves over a yard across, climbs high

into a 40 foot tree, or up the side of a house. A *Cassia* (named *nodosa* by local authority) is a climbing member of the ubiquitous cassia family, and spreads golden sheets of bloom wherever it gets a foot-hold, even to adorning the stone ruins of the deserted tobacco factories.

Flowering shrubs are bewildering in quantity, variety and beauty. *Hibiscus*, in many tones are freely used as hedge plants. *Cacsalpina pulcherrima*, commonly called Dwarf Poinciana, with lovely spidery flowers in clear yellow, orange and orange crimson is no more a respecter of persons than is its summer-blooming cousin, the Royal Poinciana, the "Queen of the Tropics," for it is found everywhere, down to the most tumble-down shanty. *Tecomaria capensis*, a glorious orange-crimson tropical member of the *Bignoniaceae* also screens porches of rich and poor alike. What is locally known as "Candle Bush," with upright stalks of curious fat closed yellow blooms (and hinted at as a *Scuccio*) is one of the arresting beauties frequently found. *Beleperone*, the "Shrimp Flower" adorns shanty yards. *Browallia speciosa major* is almost a weed. *Kalanchoe tubiflora* (not listed in Bailey), certainly one of the most beautiful of the *Crassulaceae* is as omnipresent, and although only 2-3 ft. tall in the open shoots to 5-6 ft. growing on a shady bank at the Botanical Gardens.

All in all, Key West is a paradise for the horticulturist as it is for the artists, writers, winter colonists, fishermen, etc. Those who look for the blare of night life and the Neon signs of Miami and the Beach will find little to draw them, but the horticultural visitor, with a comprehending view-point can fill hours and days in exploration and pure enjoyment and can have all the thrills of discovery that come with the find of each new, unidentifiable tropical plant.



Rooted cuttings of Chionanthus retusus

The Propagation of *Chionanthus retusus* by Cuttings

V. T. STOUTEMYER

The outstanding ornamental value of the Chinese fringe tree, *Chionanthus retusus* Lindl. & Paxt. has been recognized by all who are familiar with it. This species is entirely distinct in habit from its native American relative. Though by no means new in this country, it is still rare. Unquestionably the difficulty of propagation has contributed to the neglect of this valuable ornamental.

Layering may be used (1) and grafting on seedlings of *C. virginicus* has likewise been advocated (4). Grafting on stocks of ash has been used (4), but the combination is not entirely satisfactory (2). Though this plant has been considered to be virtually impossible to root from cuttings, the success

attending experiments with greenwood cuttings conducted by the writer during two seasons indicates that exceptionally heavy rooting in suitable commercial percentages may be obtained in about two and one half months, through use of a combination of certain modern developments in propagation technique. Recourse to more cumbersome and expensive methods of vegetative propagation appears unnecessary. Cuttings plotted in the fall were held over the winter in a cold sash greenhouse shelter but doubtless an ordinary cold frame would have been as satisfactory. The plants made excellent growth in the following season.

Four important requirements for the rapid rooting of this subject are: Main-

tenance of a high humidity over the cuttings, use of a chemical root-inducing substance, taking of the cuttings at the proper stage of growth, and a rooting medium of fine texture, retentive of moisture but well drained.

MAINTENANCE OF HIGH HUMIDITY

In a previous report (3), the author has shown that use of mechanical spray humidification increased the rooting of cuttings of this subject from 10 to 65 per cent. Several different mechanical spray devices have been used with success, but the one which gave most satisfaction in these trials was a small centrifugal atomizer driven by an enclosed electric motor. This type has been used in textile mills and for certain other industrial uses. Those who do not have mechanical installations to aid in the maintenance of a high humidity over the cuttings will need to rely on the use of closed propagating cases or bell jars along with frequent syringing of the cuttings.

USE OF PLANT GROWTH SUBSTANCES

The use of synthetic growth substances is essential for satisfactory rooting of this subject. In tests which have been conducted with several thousand cuttings during two seasons, in only one instance was a cutting rooted without the use of plant growth substances. The use of a mixture of one part of indole butyric acid and 250 parts of powdered talc applied to the moistened bases of the cuttings before setting in the propagating bench has produced satisfactory rooting with little if any injury to the bases of the cuttings. This may be considered as a dosage of intermediate concentration. Similar commercial preparations are available and should be equally satisfactory. Indole butyric acid appeared to be superior

to the naphthalene growth substances with this subject.

TIME OF TAKING THE CUTTINGS

The most favorable time of taking the cuttings of the Chinese fringe tree is relatively narrowly limited. The dates given here apply to the vicinity of Washington, D. C. and due allowances must be made for other localities. Cuttings taken between the last week of May and the first week of July will hold up well in the propagating bed without appreciable loss of leaves, but rapid and heavy rooting has been secured only from cuttings taken early in June. The influence of date of collection on the speed of rooting is shown in Table I. All cuttings were treated with the mixture of one part of indole butyric acid in 250 parts of talc. The cuttings were placed in a sand rooting medium in a greenhouse with a centrifugal atomizer, and no bottom heat was used. All counts of rooted cuttings were made on August 21.

TABLE I
INFLUENCE OF DATE OF COLLECTION
ON ROOTING OF CUTTINGS

<i>Date</i>	<i>Number of Cuttings</i>	<i>Per Cent Rooted</i>
May 20	60	0
May 27	100	27.0
June 4	40	72.5
June 23	100	5.0

These data show that the best and most rapid rooting was secured in the collection made in the first week of June. However, all of the cuttings in this experiment were in excellent condition on August 21 and additional rooting could be expected. In the previous season, cuttings taken as late as July 7 finally rooted 60 per cent although six months in the cutting bench was necessary.

These greenwood cuttings were made from long shoots of the growth of the current season, and wood from both the terminal and basal portions rooted heavily. Each cutting comprised several nodes and the basal cuts were made through a node, although rooting was not observed to have any particular relationship to the nodes. The leaves were not trimmed and as many as possible were left on the cuttings.

Unfortunately the description of the proper stage of growth for the taking of the cuttings is somewhat difficult and no satisfactory mechanical test seems to be available. The old gardener's test of snapping the stems would exclude much cutting wood which was found to root freely. The color differences of the leaves in the different collections were quite distinct and perhaps give a clue to the proper season for taking the cuttings. The collections of May 20 and 27 were a pale light green and the leaves had a thin texture. The cuttings of the lots taken on June 4 were darker, but still were definitely light green. The stems of the cuttings taken on June 23 were apparently too highly lignified for easy rooting. The leaves on these cuttings were very dark green and had a thick leathery texture. Probably only by experimentation and the keeping of careful records can the propagator determine the most favorable season for his particular locality, and this may fluctuate somewhat from year to year.

INFLUENCE OF THE ROOTING MEDIUM

The composition of the rooting medium is particularly important when a high humidity is maintained over the cuttings and the bases of the cuttings are subject to damage if aeration and drainage are poor. On the other hand, an excessively coarse and open rooting medium hinders rooting. The influence

of different rooting media is shown in Table II. These cuttings were set on June 4 and were removed on August 21. All were treated at the bases with a mixture of one part of indole butyric acid in 250 parts of powdered talc.

TABLE II
INFLUENCE OF ROOTING MEDIUM ON
ROOTING OF CUTTINGS

<i>Rooting Medium</i>	<i>Number of Cuttings</i>	<i>Per Cent Rooted</i>
Sand	40	72.5
Sand (poorly drained)	140	28.0
Sand and cinders, equal parts	160	13.0
Sand and mica insulation, equal parts	160	67.0

The addition of the leached cinders hindered rooting although the drainage was excellent in this medium. Different samples of sand show quite different rooting responses under mechanical humidification. The mixture of sand and mica insulating material deserves particular mention. Although the rooting percentage was about the same as that in sand, the average rooting was much heavier with the mica. Many of the cuttings in this medium had over a dozen roots averaging more than three inches in length, a truly remarkable development. In tests with other plants no medium has been as effective as the mixture of mica insulation and sand. This material is a mica mineral which is expanded to a fluffy texture by heating in furnaces. The product is used as insulation for building and has also been sold to a limited extent for horticultural purposes, especially the amelioration of potting soils for greenhouse use. Sands

of indifferent quality for the rooting of cuttings have formed an excellent rooting medium with the admixture of mica.

Bureau of Plant Industry, U. S. Department of Agriculture

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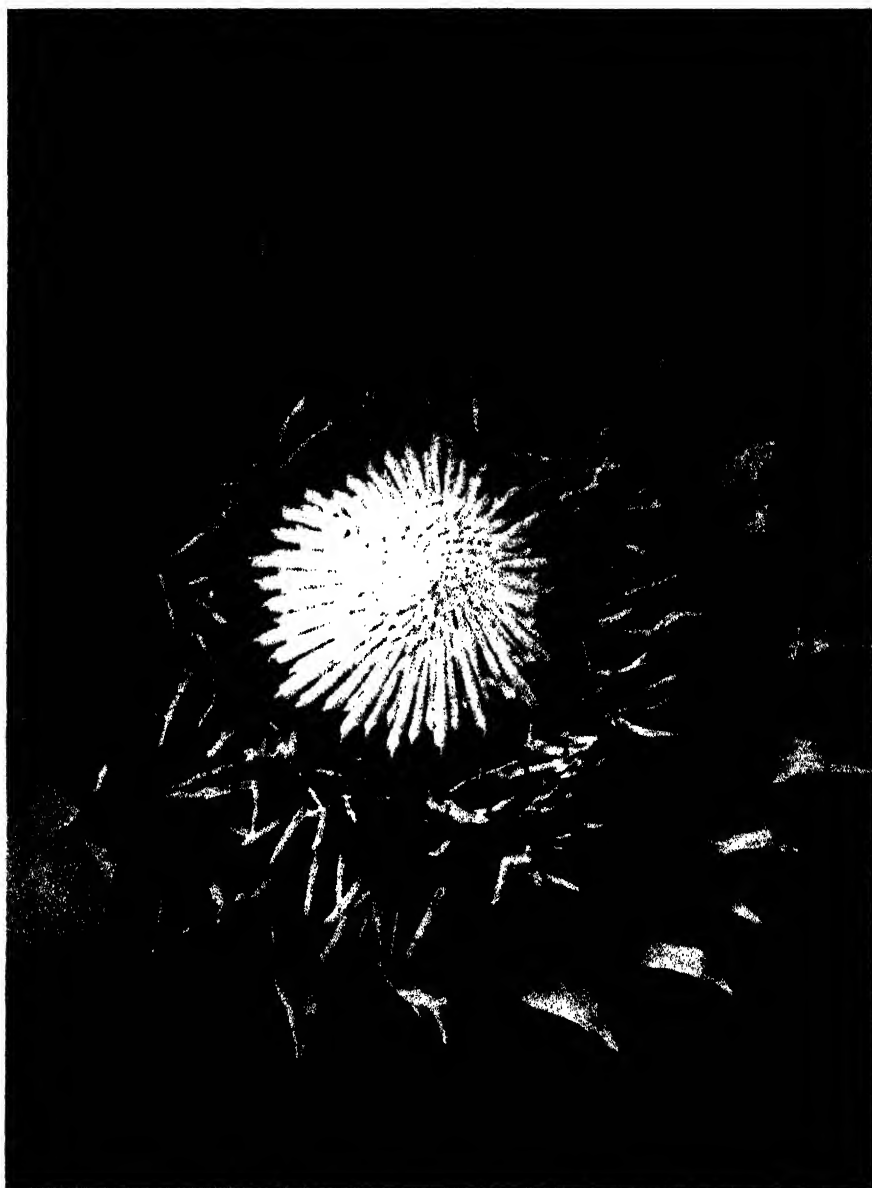
A Group of Proteads

SARAH V. COOMBS

South Africa's national flowers, the Proteas, are members of this group, which includes also many other interesting trees and shrubs. The six shrubs shown here all belong to this great Family of the Proteaceae, which has members in Australia but the largest number in South Africa. Besides the *Proteas*, there are the *Leucadendrons*, with the famous Silver Trees, the *Leucospermums*, *Serrurias*, *Mimetes* and others. The flowers have a tubular perianth, the four segments partly or completely separating. The plants are trees or shrubs, rarely perennial herbs. The flowers of many are dioecious, are usually in heads, more rarely in spikes or racemes.

Plants of this group were well known in greenhouses in England in the middle of the 19th Century but were crowded out when more modern heating and watering systems were introduced. The old kiln-heated houses with their cooler temperature and less-abundant water, suited them well and more than thirty species of the *Proteas* were grown. They are reputed to be

difficult to grow. Bailey says that their cultivation is not so much difficult as special. The hard-wooded ones, especially, will not endure over-much watering. They all need a cool temperature, much fresh air and sunlight. It is the belief of this writer that if these plants were set out of doors in summer in a sunny, windy place, they would approximate in such surroundings the conditions of their native habitat, where strong winds cause a hardening of their fibre. They do well in southern California, with their hardiness reaching quite far north in the state and many are grown there. The "Botanical Magazine" (t.1717, 1815) says that *Proteas*, *Leucadendrons*, *Leucospermums* and others all "delight in a composition of rather more than 1/3 sand and the rest light loam without any peat." *Serrurias*, it says "succeed best in 3 parts of peat, 2 parts loam and 1 part sand." Joseph Knight, writing in London in 1809 "On the cultivation of the plants belonging to the natural order of *Proteaceae* . . ." recommends a "light soapy loam, mixed with



South African Railways and Harbors

Proteca cynaroides

a greater or less proportion of sand." What is a *soapy loam*? He also thinks it better to "chuse a spot that has never been pared or burnt."

The structure of the flower head is the distinctive feature of the family. In many species the flowers are clustered, surrounded by showy bracts. The flower heads often remain in good condition for months, adding a brilliant note to the South African landscape.

Protea

The *Proteas* have alternate, entire, leathery leaves. Flowers are in many-flowered solitary heads inclosed in an involucre of imbricated bracts.

Protea cynarioides L. (King Protea, Giant Protea) is one of the handsomest. Is one of the "Suikerbosjes" (Sugar Bushes or Honey Pots) so-called because of the honey produced by the flowers when first opened. The honey is collected and made into a kind of sugar. Mrs. Bolus, South Africa's distinguished botanist, says in "A Book of South African Flowers" that there is no mistaking the identity of these flowers, whatever tint of pink the scales of the involucre may be. The color of the inner side is always deeper than that of the outer. It is the only species with long-petioled leaves. The broad blades are held out by the long petioles. The bright green leathery leaves reach five inches in length, with petioles up to five inches. The heads vary from five to eight inches in length and diameter. Though usually two to four feet in height, the shrub sometimes reaches nine feet. The name, *cynarioides* was given because of its resemblance to the Globe or French Artichoke, *Cynara*. The center of the flower is pinkish lavender. Another description (Gard. Chron. 1815) says that the flowers are disposed in a head the size of a sunflower, the bracts a

lovely shade of rose-pink and the foliage highly attractive. It has ideas of its own about flowering. Marloth (Flora of South Africa, vol. 1, pp. 148-150) says that it blossoms on the Cape Peninsula in March and April and at George, about 200 miles east, in October and November.

Leucadendron

These are trees and shrubs with entire leathery leaves. They are dioecious, with the staminate flowers in terminal sessile heads, the pistillate flowers in terminal cone-like heads with woolly bracts. They are found mostly in the south-western districts of South Africa. The Silver Trees are the beauties of this genus but it contains many other interesting shrubs and trees as well.

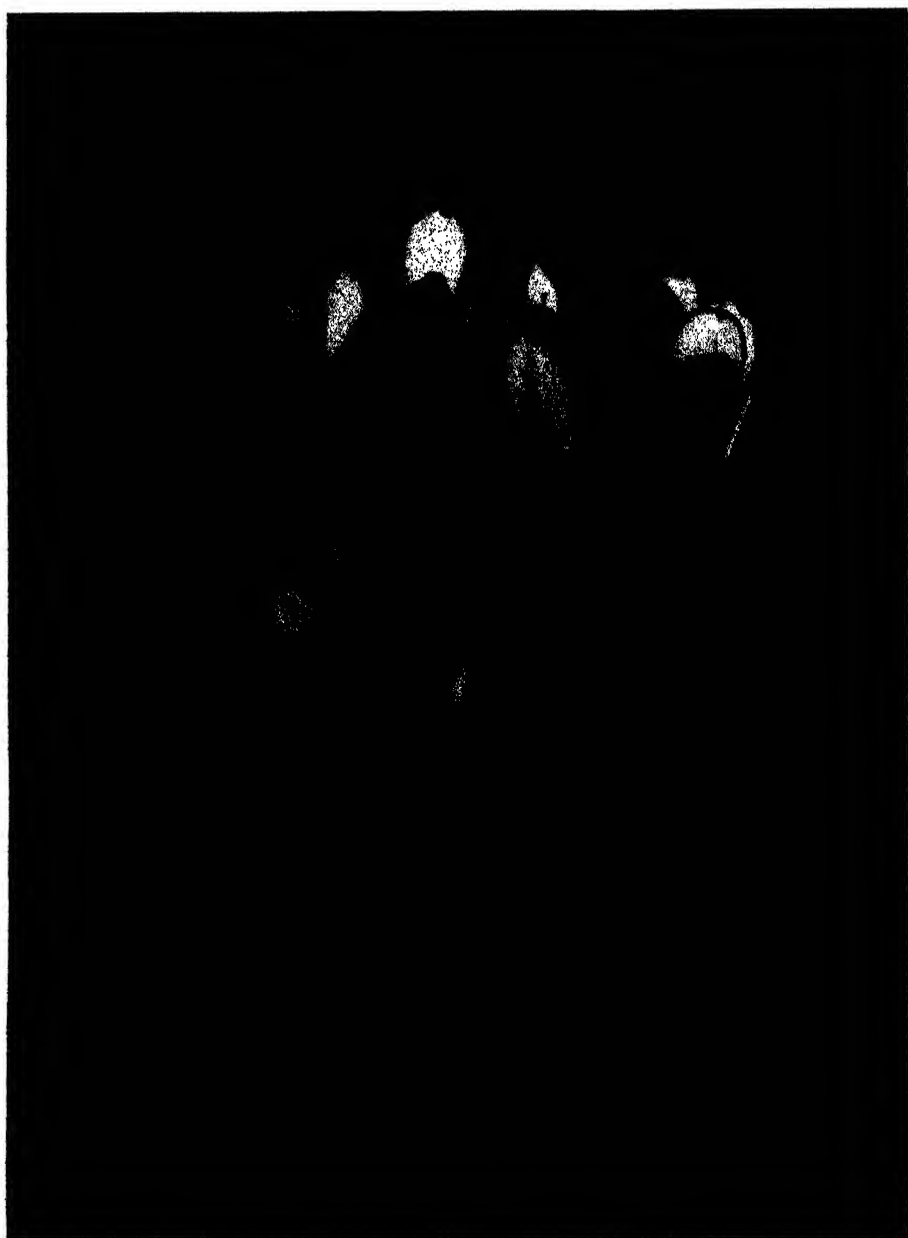
Leucadendron salignum R.Br. Geelbos (Gold or Yellow Bush), makes the hillsides golden with its leaves or luminous yellow. The male (staminate) flowers are solitary and terminal, surrounded by several colored leaves, $\frac{1}{2}$ inch long, ellipsoid; female (pistillate) flowers surrounded by several leaves, $\frac{3}{4}$ inch broad, transversely linear-oblong, rounded above, hairy.

Leucadendron cordatum Phillips. Described first in 1917 in the Annals of the Bolus Herbarium, 11.97, this plant was found near the top of a mountain in the south-west region of the Cape Province. The male flower is solitary at the end of young shoots about four inches long, which bear, in addition to the broad, ovate, rounded stem leaves, ones similar in shape and texture but bright yellow in color with red margins and tips. The flower heads are rectangular in outline, surrounded by a number of bright yellow involucral bracts. The floral bracts are yellow near the top, otherwise colorless. The flowers open from the circumference,



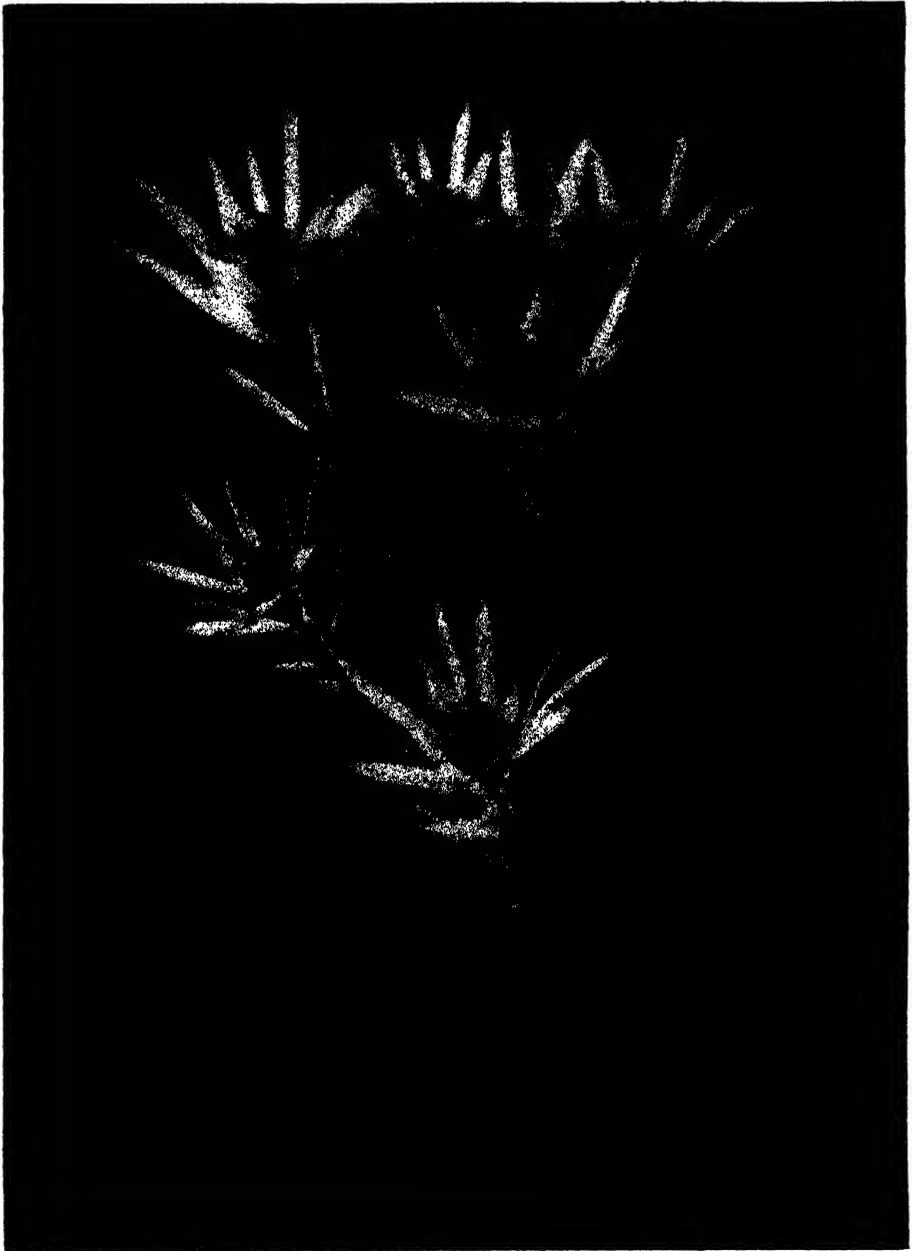
South African Railways and Harbors

Leucadendron cordatum



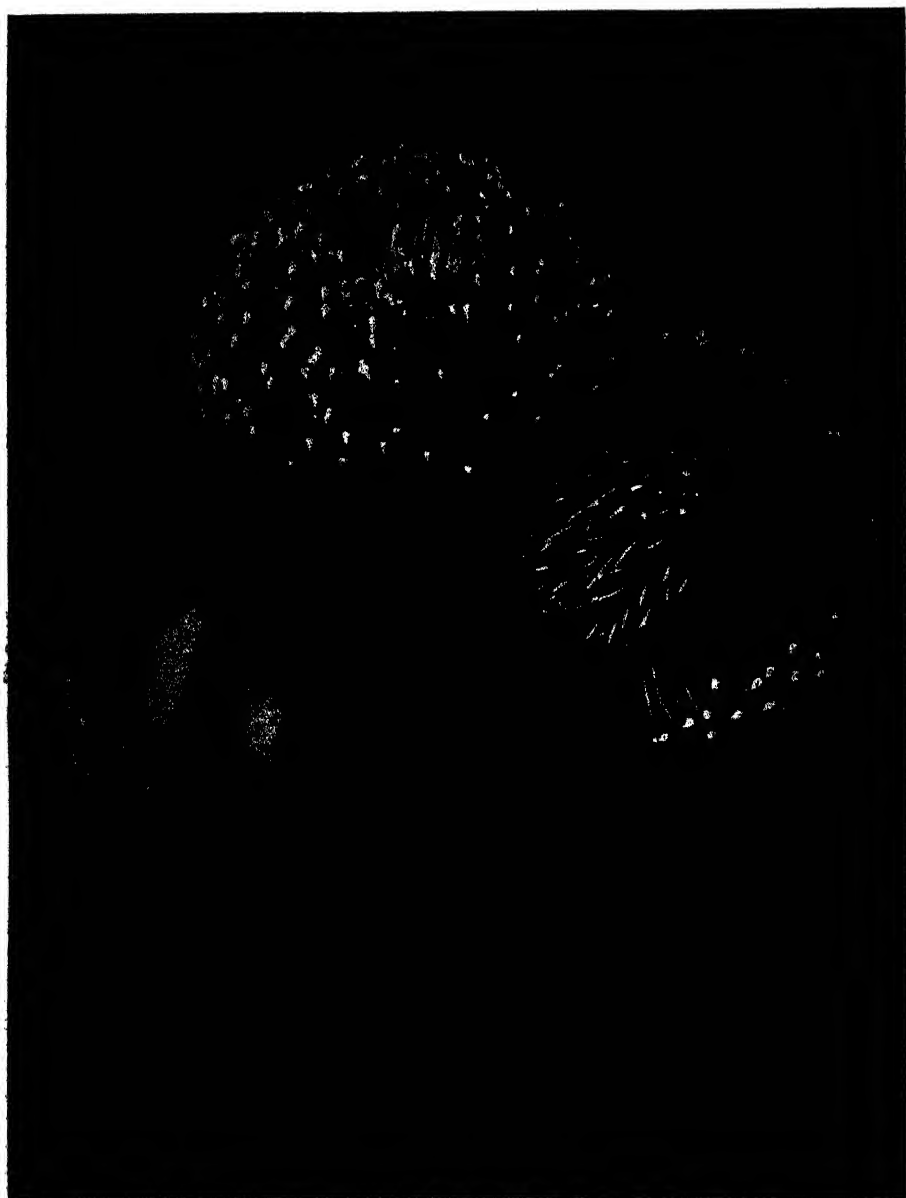
South African Railways and Harbors

Leucadendron crassifolium



South African Railways and Harbors

Leucadendron salignum



South African Railways and Harbors

Leucospermum nutans



South African Railways and Harbors

Serruria florida
"Blushing Bride"

yellow, soon becoming brown with age.

This species differs from any known one by its distinctly heart-shaped (cordate) leaves. It is said by Dr. Phillips to be an extremely handsome and showy plant, the bright yellow leaves surrounding the flower head, with their crimson edges, make the male flowers very conspicuous. After the flowers have faded, the yellow leaves turn green and function as foliage leaves.

Leucadendron crassifolium R.Br. was listed at first under *Protea* but later was transferred to the *Leucadendron* group. There seem to be only a few references to it by botanical authorities and it is unknown to this writer. The herbarium specimen in the New York Botanical Garden's collection resembles the picture closely as to leaves and general growth but flowers in that specimen were faded, with no outer petals or bracts showing, so it is presented here with a little hesitation. Its attractive appearance may justify its being included.

Leucospermum

The *Leucospermum* have dense terminal heads of yellow, red or orange-colored flowers, the style being generally most brilliantly colored and long. Small trees or shrubs or some trailing. Leaves usually very crowded, entire or toothed at the apex. Flowers in heads, usually solitary. Nearly all are found in the south-west districts of South Africa but they are found also in Natal and the Northern Transvaal. Flowers irregular.

Leucospermum nutans R.Br. The Broad-leaved Pincushion is a shrub about four feet high, with bright orange-flesh-colored heads. It is very free-flowering and long-lasting. One of these shrubs is a fine sight, covered

to the ground with hundreds of the brilliant heads. The heads are solitary without a definite involucre of barren bracts. The styles are nearly two inches long. As the flowers develop, the styles grow and force themselves out, while the upper part and the stigma are still held in the calyx. The ever-attendant sugar birds release the stigma by their touch. This condition shows very plainly in the photograph, where the styles in the center of the head are held, the outer ones having been freed.

Serruria

Shrubs, erect or more rarely prostrate, leaves often much dissected into cylindric acute segments, rarely entire, flowers in heads, often with a small involucre of barren bracts.

Serruria florida Knight. Blushing Bride. This is one of South Africa's almost vanished beauties. It belongs to this same Family of the Broteads and is a lovely flower. It is a small shrub, two to three feet high, with large showy bracts and flowers with a rosy blush. A small group of these flowers was growing, a few years ago, in the National Botanic Garden, Kirstenbosch, near Cape Town. Except for a few plants in other places, it was almost extinct. Perhaps a larger number has been cultivated since. It would be a sad loss, if such a charming flower were gone.

Seeds of many of the Proteas, *Leucodendrons* and *Leucospermums* may be obtained from Botanic Gardens in South Africa; the modest subscription price for membership brings the opportunity to choose a number of kinds of seeds annually, ones often unobtainable elsewhere. They are worth far more than the subscription price.

A Book or Two

Field Crops and Land Use. Joseph F. Cox and Lyman E. Jackson. John Wiley & Sons, Inc., New York, 1942. 473 pages, illustrated. \$3.75.

"This book is dedicated to the growing army of American farmers who plan and execute their programs of efficient crop and livestock production so as to improve the fertility of the soils in their charge, provide for the Nation's needs during times of peace and war, and assure the onward course of our country toward ever-increasing prosperity and enhanced freedom."

This is followed by a foreword by Secretary of Agriculture, the Honorable Claude R. Wickard, dated April 4 of this year.

This is a reference book, compact and succinct in spite of its length. Its purpose is to set forth in an easily understood fashion the current practices that lead to the best agricultural practices. It is tinctured at times by many expressions of opinion which are distinctly of our times, but since our times are setting the immediate pattern of the time to come, no one may cavil at this. To those who are not farmers it should be required reading for our national understanding; to those who are farmers, it need no recommendation from us.

The Nature and Prevention of Plant Diseases. K. Starr Chester, The Blackiston Company, Philadelphia, 1942. 584 pages, illustrated. \$4.50.

Like the last, this is a reference book and like the last it is colored by our times. It is written to read and used not only by the student but by the intelligent, progressive individual for

whom farming is life. That it should appear at this time, when the success of our agriculture must be related not only to ourselves as a nation but to the world, may or may not be significant, but its appearance is opportune.

Ornamental American Shrubs. William R. Van Dersal, Oxford University Press, New York, 1942. 288 pages, illustrated. \$4.00.

This is a most interesting book. Whether one agrees with it, from "cover to cover" makes no particle of difference. The author has travelled widely, photographed endlessly, made notes even more abundantly and has not suffered too much, from sitting in libraries to the exclusion of all else.

There are many species noted here, that the reviewer would not consider having in a small suburban garden where one's pleasures must be carefully chosen, but were the garden large enough, none would be omitted that would survive the climate; since soil can be managed more easily than weather.

The next is easy reading, designed for persuasion toward planting rather than to impress for profundity of erudition—but there was no lack of care in the preparation of the material and the captions will not find anything to merit their efforts.

Succulent Plants of New and Old World Deserts. E. J. Alexander, New York Botanical Garden, New York, 1942. 64 pages, illustrated. \$50.

This is a very pleasant booklet, in which are brought together with some

additional material, several articles that have appeared in the *Journal of the Garden*. The photographs are numerous and delightful; valuable moreover since they serve to emphasize the particular beauties of succulent plants, their amazing structure architectural in quality and style, as well as the equally amazing contrasts in substance, delicacy opposed to harshness, smoothness opposed to spininess; translucency opposed to opaqueness.

The illustrations in no way overshadow the text which is straightforward and clear, although naturally reduced because of the planning of the 64 pages. One could have wished for more text in many places although one can equally well understand the reasons for brevity.

Meet the Natives. M. Walker Pesman, Author's edition, 372 S. Humboldt St., Denver, Colo., 1942. 216 pages, illustrated. \$1.25.

The author speaking: "Just between you and me—don't buy this book if you know too much. This is not a book for botanists . . . The purpose of this book is to make it easy to become acquainted with the widespread, the conspicuous, the beautiful and interesting trees, shrubs and wildflowers (herbs, technically speaking)" All of which is "fair enough."

We don't know "too much" but it is the sort of book we don't really like but would undoubtedly use! Everything possible has been done to make it easy for the simple-minded but eager flower lovers. Perhaps it is only innate snobbery but to find all the notes about red, pink and reddish purple flower on pink paper, those for blue and bluish-purple on blue paper, etc., rather rubs in by ignorance, be like the pictures—an admission that should complete our condemnation.

The Gardener's Pocketbook

From the Midwestern Horticultural Society

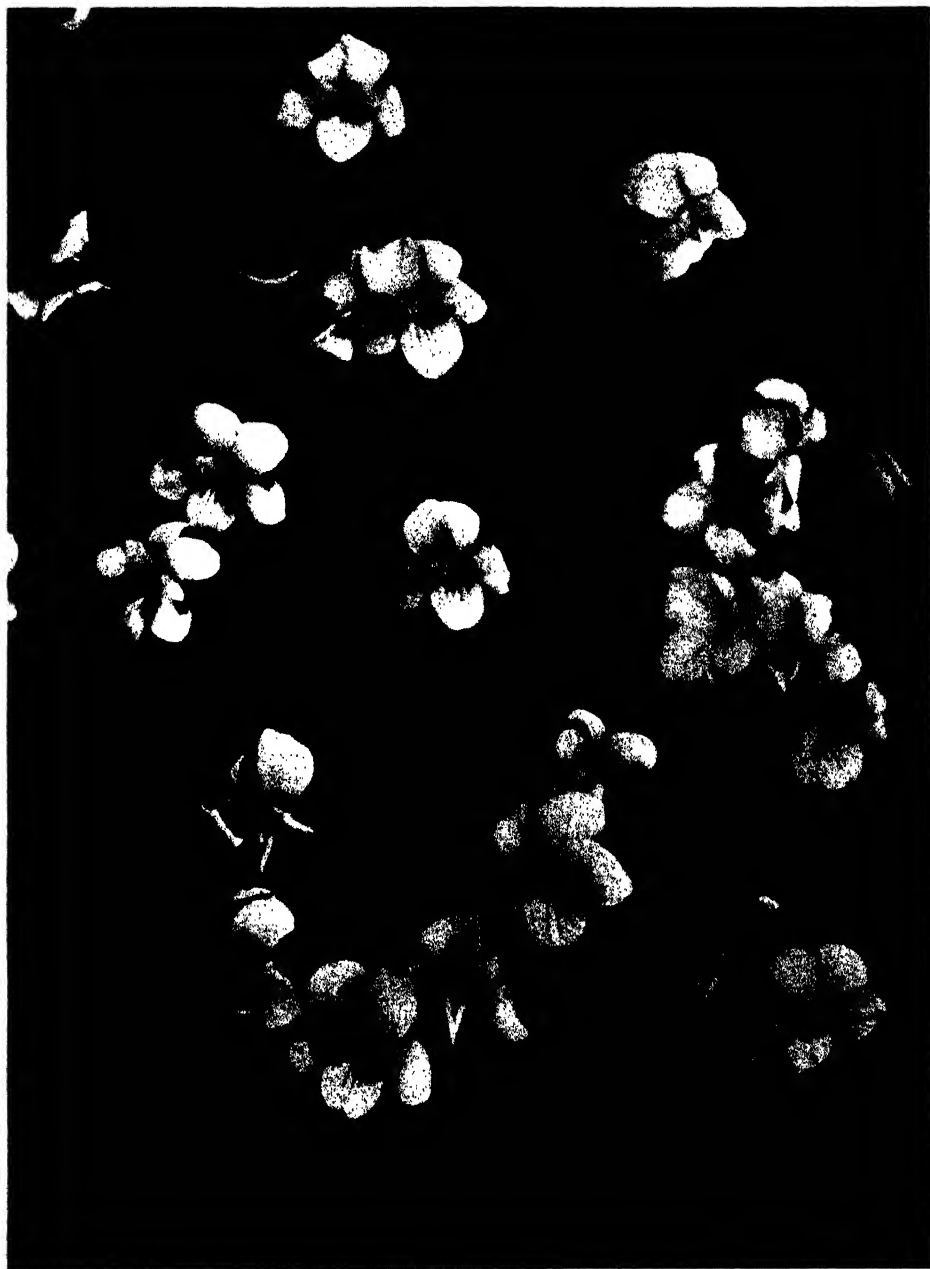
Gentians

Most people in this region are familiar with two of the native gentians. One is the rather common closed gentian (*Gentiana Andrewsii*) and the other is the rarer fringed gentian (*Gentiana crinita*). A third is still harder to find but more attractive than the others, it is the Prairie gentian (*G. puberula*) which has open flowers like the fringed but a habit of growth like the closed.

The fringed gentian is notoriously difficult to handle as it is a biennial.

The Prairie gentian resents disturbance and so far efforts on my part to cultivate it have been conspicuously unsuccessful. Fall and spring transplanting, with and without ball, have not produced any results than a gradual decline of the plant. The closed gentian although much more roughly treated has always responded with good growth and flowers.

The closed gentian is a plant for the wild garden or the perennial border. It is at home in any good loam and may be easily transplanted from the wild. Its bright blue flowers when seen in a group on the plant are strikingly beautiful. It is one of the perennials



Claude Hope

[See page 196]

Viola Striata

that finishes the season in the garden with as much brilliance as the Spring bulbs which start it.

ELDRED E. GREEN.

Corylus avellana

In places where a tall shrub can be used the European Hazel, *Corylus avellana* may well be considered. In this locality the plant will reach a height of about sixteen feet with an arching spread nearly equal to the height. While this is unmistakably a hazel in the leaves and catkins and fruit, yet the tall growth and strong stems keep it from being a straggly thicket-former of the native species.

I have seen this species used as a canopy over walks and as tall background material. In bold plantings or perhaps in a large woodland grouping this is one of the tall shrubs that has been overlooked.

Plant geographers have repeatedly emphasized the close affinity between the floras of the northern parts of Europe, Asia and America. In the hazels, species are found in all three of these continents, with the Asiatic forms being slightly more difficult in culture due to greater diversity in their native habitat.

ELDRED E. GREEN.

Goutweed

It seems rather superfluous that a writer should have to call attention to this old-fashioned plant. However, I have seen instances where well trained florists did not know the identity of the plant when shown them. It is one of the plants that is not too commonly seen around here, but wherever it is, it always attracts much notice and favorable comment especially when seen in the variegated form.

Technically the plant is known as *Aegopodium Podagraria*. It is a low growing rather coarse-leaved plant that has a creeping underground stem. This stem produces wide spreading branches that soon form a mat. The plant is a member of the Carrot family and the flowers are in small umbels that show a close resemblance to the wild carrot. The foliage could easily pass for a diminutive spreading parsnip plant.

The plain form has nothing to recommend it except for a different mat in partial shade. The variegated form is decidedly attractive as the margins of the leaves are a clear white that stands out well. As a white border it is excellent. My first and most vivid recollection of this plant is in a garden where it is used as a border for flaming Oriental poppies.

Culturally the plant is not fussy. Any ordinary soil with half exposure or better is all that is necessary. An occasional edging to keep the spreading stems in bound is all that is needed. The plant is easily propagated from these side stems.

ELDRED E. GREEN.

Acer glabrum Torr.

Several years ago while vacationing in Colorado in the Pike's Peak district, where according to Theodore Roosevelt the scenery bankrupts the English language, and the vegetation is equally fascinating we used to enjoy the hike up the Peak, walking up the cog-railroad to the Halfway House. If I may digress, we find walking in the mountains not as fatiguing as in the lower altitudes. As a boy the writer on one occasion walked from Cripple Creek, during the Gold Rush, before the little town was a year old, to Colorado Springs, a distance of thirty miles without being tired.



Claude Hope

[See page 196]

Puschkinia scilloides

Near the timber line on Pike's Peak we found *Acer glabrum* growing as a dwarf shrub, full of seed, usually not more than four or five feet in height, though probably centuries old. On one occasion we gathered a pocketfull of seed and mailed them home to Houston where they were planted in the greenhouse and germinated quickly. Some of them have grown into magnificent specimens and adorn some of our finest homes assuming the form and proportions of the sugar maples so popular in the North. Strange to say the latter (*A. saccharum*) is a complete failure here and the silver maple (*A. saccharinum*) does so poorly it is of no value, while *A. glabrum* is of rapid growth, in comparatively few years having attained a diameter of 16 to 18 inches and a well-rounded top 30 to 40 feet in height. It seems to be immune to insect attack which affect other maples, colors beautifully in the fall and seems admirably adapted to the soil and climate of the Gulf Coast Region.

This seems to prove one of these remarkable instances where a "transplanted product" thrives so well in a completely different environment. Its dwarfed habit does not affect its development, as is the case with so many conifers, when given an opportunity and where few trees from the high altitude survive. Our late friend, T. V. Munson, of Denison, Texas, one of the pioneer nurserymen told me many years ago, those conifers such as the beautiful Colorado Blue Spruce, *Picea pungens* would not survive south of the Red River which we found true after much experimentation, but isothermic lines do not seem to mean anything to *Acer glabrum* which well deserves a foremost place among our ornamental trees.

EDWARD TEAS.

Houston, Texas.

A Few Ozark Wild Flowers

The beautiful red *Pentstemon eatoni* is the only member of that royal American family of lovely flowers which I have ever seen or grown that anywhere near equals the Ozark Pentstemon. It is classed as a variation of *P. cobea*. It is true it has the shining leaves of *cobea*, also its habit of growth, but otherwise it is so different that it surely deserves a distinct name of its own.

The flowers are larger than the ordinary *cobea* but the same shape, though without marking. They form big, heavy heads, with, in an old plant, many stems. Their color is something seldom seen in either wild or garden flowers and hard to describe, being a glowing rosy purple and yet not purple, either, as the blue cast is missing; maybe a glorified magenta might come nearer. I hesitate to give that colorating, however, for that much maligned color is death to the popularity of any flower, no matter how good, to some gardeners.

There are so many breath taking groupings of the wild flowers here in the Ozarks that one can scarcely make that statement about any; still, when we drive along and find these pentstemon growing in a thick, natural planting against the trees, at the roadside, it really has that effect. This Beards-tongue is not too common, as in our wanderings over pretty much of the northwest part of the state we have encountered it in but two localities, but where found, it usually is in good sized colonies.

There is nothing lovelier, it seems to me, until I see a bank covered with a soft blue carpet of the big flat beauties of the Birdfoot violet, *V. pedata*, or, scattered beneath the oaks, gleaming, rosy *Phlox pilosa*, starred all through with clumps of the vivid stars of *Silene*

virginica. Or to find in the early spring, under a grouping of snowy white dogwood, a carpeting of equally white bloodroot, mingled with rue anemone in white and pink, above its ruffles of dainty leaves.

Then, in the later summer along our little spring-branch, the dwarf blue lobelia makes a picture that delights the eye, even of those who claim to sniff at "just a wild flower." This is seemingly identical with *Lobelia syphilitica*, except in height, which does not exceed eighteen inches. The stems are clothed for the greater part of their length with the gentian-blue flowers lasting for days, to be replaced, as they fade, by new buds formed at their base. This makes a long display. I found one small stem in bloom at Christmas time last year.

Two really blue, tuberous-rooted delphinium come into bloom about with the phloxes, one coming on just as the other finishes, and disappear almost as soon as out of bloom. Both are pretty and quite worth while.

The wild Sweet William, *Phlox divaricata*, in shades of lavender, blooms along with *P. pilosa* and is always lovely. These flowers are all easily adapted to garden culture, but there is another grand silence that I have not been able to handle either in plant or seeds. We have never found but a few of this silene. It has much the same wide scarlet stars and the characteristically sticky foliage of *S. virginica*, only blooms later in the season and is a much larger plant, growing its many stems in a stiff, upright form, whereas *S. virginica* throws its stems out more or less horizontally, in a loose, open formation. Both are grand plants. In cultivation *S. virginica* continues to bloom for weeks, much longer than in the wild.

The wild verbena is a gorgeous sight anywhere one may find its solid mats

of color but has proven a disappointment in the garden. While it is of the easiest culture and can be successfully brought in, even in full bloom, still the nature of the plant seems to change, even though it is only moved a few feet into identical soil. It apparently loses its flowering ambition and sprawls around, giving numbers of lovely rose heads of bloom, it is true, but nothing like the delightfully dense flower mass of its wild state. I wish I could make you see one glorious grouping of this flower as we saw it this spring. Just beyond the fence, at the edge of one of our little fields, there were many mats of it growing among the scattered oaks and cedars. Most of them in full sun, but many were snuggled up under dense cedars where they only received an hour, probably, of sun during the day, but every plant so completely covered with the low compact flower heads, it seemed like one big bloom. That was one of the loveliest pictures a lover of pink and rose-colored flowers could ever see.

I like the tall, 14 to 18 in., Sept.-Oct. blooming *Allium* which we find here, though am not sure of its identity. It has large heads of soft, rosy blooms, the flowers comparatively large and comes, too, at a good time, when wild flowers are scarce.

The pale blue camassia that blooms with the phloxes is good, too. I have never liked this flower until this spring. It might be the beautiful natural setting added to its attractiveness for I have grown it years ago and thought it rather insipid. I have planted some with a good pink shade of the wild geranium, the same companion with which it was growing in the woods, and am expecting it to be at least worth keeping.

MRS. H. P. MAGERS

*Greengates, R. 1,
Mountain Home, Ark.*

Massonia pustulata Jacq. [See page 195]

Redouté in "Les Liliacées" (Vol. IV, Pl. 183, 1808) speaks slightly of this odd little South African plant. He says (roughly translated) that it presents neither the brilliancy of color nor the elegant appearance of most of the members of the lily family and that one could hardly believe, at first glance, that it could belong to the family, if all the necessary characters did not indicate its relationship. In spite of the apparent finality of this crushing description, we still affirm that the plant has a certain modest charm. Its two queer deeply-grooved and pustulate leaves, its greenish white flowers in a sort of cup effect between them and its prominent stamens make a combination appropriate in itself and one rather alluring to the possible grower.

An article in "The Gardener's Chronicle" (ser. III, 39, page 44, 1906) calls it "this very curious and interesting plant" and states that it had received a Botanical Certificate from the Scientific Committee of the Royal Horticultural Society at its last meeting. Though not rare in English gardens, it is said not to seem to have been found wild since it was first seen by Masson, the collector, over a hundred years ago.

Describing it in the "Botanists Repository" (Vol. IV, Pl. ccxx, 1802) under the name *Massonia scabra* Thunb. (this name being a synonym), Andrews says that it was introduced into England in 1796 and flowered for the first time there in 1800. He calls it a hardy greenhouse bulb, propagated from the root and seeds, flowering in England in February and March, losing its leaves in June. The roots, he says, should not be taken from the pots after the decay of the leaves but kept rather dry till the leaves begin to reappear. Much evidently of sarcasm and criticism is included in the follow-

ing quotation, though almost one hundred and forty years later, the exact point escapes us: "Much will it contribute," he says, "to the illustration of science, to find our present figure, when copied into a certain magazine at some future period (and of which we have no doubt), specifically denominated smooth-leaved; as unfortunately, the other species figured by us, Pl. 46, Vol. I, with obovate, blunt-ended or spatula-shaped leaves, has been, by certain hocus-pocus conjurer, and *our very good friend*, converted into sword-shaped! *risum teneatus*." I wonder who the villain was.

The plant belongs to a genus of the Liliaceae. The genus, Dr. Pole Evans says in "Flowering Plants of South Africa" (Vol. II, 1922), is very imperfectly known, as about 24 out of the 33 species described in the "Flora Capensis" (Vol. VI, page 408, 1896-7) have never been collected within the last fifty years, or are only known from figures in botanical publications. Bailey, "Standard Cyclopaedia" (Vol. II, page 2010, 1935), describes them as allied to *Allium*; rarely grown as pot plants in the greenhouse. They have two or three broad opposite leaves a very short scape, so that the usually white or greenish flowers are borne in a sessile or nearly sessile globose head at the surface of the ground surrounded by several membranous bracts. *Massonia pustulata* has an ovoid bulb, one inch in diameter, ribbed tuberculate broad-oblong leaves and greenish flowers in the cup of pustulate foliage; perianth tube cylindrical, the segments narrow and spreading; stamens long and up-standing.

In the "Botanical Magazine" (Vol. 17, tab. 642, 1803) it is called the "Shagreen-leaved Massonia" from its leathery thick leaves, set with small conical tubercles in the manner of the untanned leather known as shagreen.



South African Railways and Harbors

[See page 194]

Massonia pustulata

The tube of the corolla is filled with a clear nectar-like liquid, which rising above the brim, adds to the singular appearance of the plant. Marloth illustrates it, in "The Flora of South Africa" (Vol. IV, Pl. 23, 1915).

A warm greenhouse temperature with plenty of water in the growing season, and little or none during the resting stage, seem to be indicated.

SARAH V. COOMBS
Scarsdale, New York.

Viola striata [See page 189]

It has been a rather general observation among our gardening friends that the inclusion of our native Eastern violets in the garden is a moot point and that all may be divided into two camps: those who will have none of them because of their prodigality and those who do, whether for reasons of choice or of inertia.

Many years ago a few plants of *Viola striata* were brought into the garden together with plants of *Phlox divaricata*, both abundantly native in our Potomac River valley in those parts to their liking, and it still remains uncertain as to which has been more prodigal in repopulating the earth. Each year at blooming time the creamy masses of the violet and the lavender haze of the river phlox soften the heart and confirm us in our inertia.

Like many native violets, this starts into growth early in spring with fat tufts of leaves and short stalks that do not suggest the height to which they will attain later. The photograph is taken at that stage and gives a good idea of the freedom of bloom. Later this abundance is less apparent as the developing stems carry the plant upwards, perhaps to a foot or more, flowering from almost every axil (and seeding as well), through a long time.

The petals are broad, creamy in color, with dull violet striations, particu-

larly in the lowermost. There is no appreciable scent.

Here it grows too well and too widely, caring little as to whether the location be in sun, half shade or shade: in sandy gravel path, the ordinary clay of the hillside or the deeply worked beds prepared for humus-loving species. It may be transplanted at almost any season and has gone out into other gardens, always with the warning that it will not stay put, a warning not always heeded by those who see it for the first time in the way Mr. Hope has recorded it for the illustration.

Puschkinia scilloides [See page 191]

Better gardeners than I have had a word to say about this delightful spring flowering bulb that so often has to take its place in the chapter devoted to "Minor Bulbs." There is no gainsaying the fact that it is a minor bulb, if one is talking of size, or if one speaks of its occurrence in trade, but surely it is no more a small fry than *Scilla sibirica*, which any gardener knows and which he can buy (or could buy) without much ado.

It must be admitted, of course, if one may judge by its performance here, that it does not self-sow with the abandon of that species and seems less inclined to make offsets, all due, perhaps, to the rather offhand gardening practices to which it must submit itself on my overgrown and overly shaded hillside.

If there is any virtue in the clump recorded here, it lies perhaps in the fact that the bulbs were raised from seed, a needless task but one that took its part in a time when curiosity prompted me to raise a considerable number of bulbs from seed to prove to myself the ease or difficulty of the procedure.

As to difficulty, there is none save that of getting the seed. Whether these were begged or bought is not remem-



Claude Hope

[See page 198]

Magnolia stellata × *Kobus*

bered, but the seeds were put in a small pot and given the same treatment in the cold frame that was given to the annual crops of daffodil seeds. Germination came the following spring and after two years in a pot, the bulbs, then the size of a fat pea, were put out in the open ground. Two years later the flowers came and each year since have bloomed as shown.

The color at a distance is nearly white. Close by the tinted white shows that faint greenish-blue wash and the deeper greenish-blue marking that separates it from all its spring-blooming companions, save possibly *Scilla tubergiana*, which is no competitor, since it flowers much earlier in the year, so early often that it is caught by a late frost.

Now that each gardener should and perhaps may regard each "minor" plant as a garden treasure to be safeguarded against a happier time, others may be moved to sow a seed or two. Native of Asia Minor, it is patient of heat and cold, of dryness and of spring rains; it should find a wide usefulness for most of us.

Passiflora incarnata [See page 169]

Within the last few years, the passion-flowers have been illustrated in several species and in 1938 Miss Jones had a note of this in her article on Vines for California. Among the various species and forms possible there, this cannot be considered as one of the best, but for those who cannot garden in such climates as California provides, it is not too poor a representative of the large and mostly tropical genus.

To quote Bailey's *Cyclopedia*, "A weedy plant but offered by dealers in native plants. With protection, the roots will survive the winter as far north as Baltimore, and the strong herbaceous vines make a fine cover for arbors and verandahs. Easily grown

from seeds." This is faint praise and properly damming within limits, if one recalls the more brilliant flowers of the tropics.

From another point of view, there is something to be said for it. Planted in poor soil, not so rich as to stimulate luxuriant growth but not so poor as to stunt it, the plant can be used with shrubs, scrambling over and through them in the same fine way that some clematis species drape the roadside. It has also been observed growing flat over the ground like an unwilling ground cover.

As can be seen from the picture, the circle of tortuous fringe with its faint zones (or halos) of purplish color overshadow the calyx parts beneath.

Someday, perhaps, some Californian with pollen of more brilliant species at his disposal may trouble himself to fertilize this plant and rear a host of seedlings some few of which may give us a combination of the relative hardiness of *incarnata* with the brilliance of the more southern species and then?

Magnolia stellata × *Kobus* [See page 197]

The branches from which the picture was made came from a plant layered from a seedling raised by the late Dr. Walter Van Fleet more often recalled in connection with roses, but really a plantsman with wide and varied interests. The story of the crossing given was that a pink flowered form of *stellata* had been pollinated by *Kobus*. Among the ten or twelve seedlings existent at the time the garden was known to me, there was little variation either in habit or flowering and no individual with rose-tinting in the blooms.

The original trees are no longer available for observation but those from layers have grown well, now twelve to fifteen feet in height with no suggestion that they have finished their



Claude Hope

[See page 200]

Aesculus parviflora

growth. Each spring, a little before the time when the Soulangé magnolias are flowering, and at about the same time as the reputed parents, the trees are covered with their starry flowers.

As compared with *stellata* the plant is slower in coming into flower, which fact, together with its more treelike habit, may tend to confirm the story of its origin.

As to whether or not its beauty is distinct enough to lift it above its parents, each of them sufficiently fine in themselves, one hesitates to say; but whether in flower or in leaf, or later when its orange to scarlet coated seeds are greedily and prematurely eaten by the gray squirrels that overrun the hill, it is a fine thing and a happy reminder of a great gardener.

Aesculus parviflora [See page 199]

If one were to succumb to the modern passion for bibliographic lists, it might be found that this American shrub native to our southeastern states would make a brave showing, since it has been known in cultivation since the end of the 18th century.

The present note need not be added to that list since it has but one purpose, to reiterate the usefulness of this summer-flowering shrub in shady but not really dark situations.

The photograph shows clearly enough gross details of both leaf and inflorescence and suggests the denseness of the accompanying growth which over-shades our plants from noon till sundown.

In one of the parks in Washington, D. C., which is essentially an open wood with trees high enough and clear

enough to permit grass beneath, but closely enough planted so as to suggest a grassy wood and not a lawn with trees, this plant has been used in groups which almost every year are covered with these spires that become longer and more fringe-like as all the flowers open.

Here little seed is developed but if one finds seed, it is well to plant it forthwith, so that the tap root may form the same autumn and the shoot come up the following spring in its own leisurely fashion.

CORRECTION

Mr. Wyndham Hayward very kindly points out an error in Mr. Balls' article, which we hasten to say is ours and not Mr. Balls', namely the mention on page 153 of *Pamea* instead of *Pameanthe*. Our thanks to Mr. Hayward and our further apologies to Mr. Balls.

The Lily Slide Committee of the American Horticultural Society has assembled and offers for rental to Garden Clubs and other groups, Kodachrome Slides of Lilies. These have been arranged in two sets, one for the beginner in lily growing, showing cultural practices and lilies easy to grow; the other, for the more advanced grower, is a general collection of lily pictures.

For full description and terms of rental, please write to Mrs. Joseph G. Walker, Woodberry Forest, Virginia.

American Plants

In many of the issues of the magazine during the last few years, there have been notes from our Director, Mrs. Henry, that have reflected her interest and activity in collecting native plants in various parts of the United States, of late chiefly in our South. These have dealt not only with the re-discovery in a horticultural sense of plants long known to botanical science, but also with the discovery of individual plants that showed variation from the norm of the species, of sufficient interest to bring them into vegetative cultivation.

Fortunately for us, these days have not been buried forever in Mrs. Henry's own garden from which they left the world through her generous gifts. The Upperbank Nursery of Media, Pennsylvania, has taken over the stock of many of them, propagated them and has just issued a catalogue of those that are available for the gardener who wishes a vicarious share in her journeyings. The list is imposing both in number and in kind and merits the attention of the gardener who concerns himself with his native flora; the same sort of concern that prompted Dr. Van Dersal to write the book reviewed elsewhere in this issue.

Doubtless due to the limited nature of the original stock and to certain difficulties in propagation, the prices are not those of ordinary plants, but this need not deter one, since it means only that he must prolong the pleasures of purchase over more than one season, during which time the propagation can go on and prices tumble.

In all gardening history there have been times when the garden world was enriched with the flora of special areas, and one of the pleasures of library browsing is always that of noting the introduction of plants from the differ-

ent parts of the world. To cite a single example, Curtis Botanical Magazine, as a constant reflector of the historical introduction of plants, is quite enough. Although this journal does not always win for itself the complete admiration of taxonomists, it does give a passing picture of the times and points out the change in interest in the British gardening public, which successively had the privilege of many plants from the four corners of the globe.

It may easily be that we shall have now an era in which we shall be as keenly aware of the riches of this country, as have been gardeners overseas who have sometimes known more of our plants than we ourselves.

Wintersweet

Each turn of the year, as the outdoor picture changes from the richness of autumn to the period when one can appease his garden hunger only with the plants he may grow indoors, or the static beauty of nature in her time of sleep, there are a few plants that offer their period of bloom, no matter how unnatural it may appear.

With perhaps tiresome repetitiousness, it may be mentioned that to the beautiful witchhazels might be added the Oriental wintersweet, known both as *Chimonanthus fragrans* and *Meratia praecox* in gardening literature. It has been mentioned here before and various plants have been bought and planted as a result of such notices but it is still not common.

Closely related to the sweet-shrubs (*Calycanthus spp.*) which it resembles superficially in many ways, it produces its fragrant flowers through late autumn and winter, running the usual race between frost and freezing that decides the fate of so many plants that tempt the end of the season. Further south, this hazard is not so great, but it is to be supposed that there too it



Lilian A. Guernsey

Rhododendron mucronulatum

[See page 203]

may be caught at times and miss its flowering.

Unlike the sweet-shrubs which all have brownish flowers, this has yellow blooms with petals of a more translucent texture, the innermost marked with dull red. Its distinction, however, lies in its scent, which always reminds me of the old Chinese tazetta narcissus that meant the Chinese New Year Season in our parts, a scent that is both heavy and acute if one will permit such a seeming paradox. The one apparent necessity in bringing it into the house as a cut flower is to temper its transition from the cold outside to the heated house, by a period in a coldish room. Some of the open flowers and some of the smaller buds will fall, but enough will last to make it a pleasure for days, even if the homely coloring will not, cannot compete with berried sprays nor late chrysanthemums.

There is some variation among the plants known here, both in the degree of yellowness and in the time of flowering. Curiously enough, the one plant that always has flowered in November has never borne a seed-pod, while some that never have opened before late December often have a few of the curious fruits that at first sight suggest the cocoons of the great *Cecropia* moths. Some day, perhaps, a patient gardener who lives where seeds may be had, will raise a great quantity from them and choose the individuals that offer the greatest range of variation for the benefit of winter gardens.

Rhododendron mucronulatum [See page 202]

Like the last shrub, this too has been mentioned in the magazine more than once, and while it cannot be considered with any safety as a winter-flowering shrub, it falls into that very useful category of shrubs which go into the winter with all their flower buds fully

formed and perfectly ready for the first warm days of Spring. Here, near Washington, it is frequently beguiled in midwinter by our uncertain warmth in unfolding its flowers which normally should compete in the season of forsythia.

The shoots from which the photograph was made were taken from youngish plants that were still busied in growing up to form the structure of the shrub and had not yet branched out into the mature twiggy form of the mature plant. They should not be considered therefore as meaning that the plant is always stiff and graceless. Far from it.

When first introduced there were plants available of the related *R. dauricum* from which this plant differs in minor ways in the gardener's measure. Of late this plant has been the more common, but as it does not come from cuttings with the ease that characterizes so many azaleas and some rhododendrons, its propagation by seed has not been as general as it well might be. If the seeds are sown on sifted sphagnum moss and grown on, following the technique indicated in recent papers in this journal, there is little difficulty in getting a goodly progeny in short order and the young plants grow quickly and flower when quite young.

It is remarkably hardy to cold and reasonably patient with summer droughts. If it has any marked dislike, it would seem to be against overshadowing which reduced the vigor of growth and the resultant flowering, as well as the brilliancy of autumn color, one of the features that makes it useful.

As is probably recalled, its flowers though often described as rose-purple are of that color that loses the purple when planted where light shines through them, and still more, if underplanted with flowers that are truly purple or violet.

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MEMBERSHIP LIST

THE AMERICAN HORTICULTURAL SOCIETY

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Garden Clubs

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 American Fuchsia Society, Calif. Acad. of Sciences, Golden Gate Park, San Francisco, Calif.
 California Garden Clubs, Inc., Mrs. Chas. P. McCullough, Librarian, Box 114, Altadena, Cal.
 California Horticultural Society, 300 Montgomery St., San Francisco, Calif.
 Community Garden Club of Bethesda, Miss Sue Thomas, Pres., 6808 Exfair Rd., Edgemoor, Bethesda, Md.
 Fauquier & Loudoun Garden Club, Mrs. W. F. Rust, Pres., Leesburg, Va.
 Federated Garden Clubs of Cincinnati & Vicinity, Mrs. Charles W. Bosworth, Pres., Cincinnati Country Club, Grandin Rd., Cincinnati, Ohio.
 Federated Garden Clubs of Maryland, Room 300, The Belvedere, Baltimore, Md.
 Forest Hills Garden Club, Mrs. E. Barr, President, 3623 Chesapeake St., N. W., Washington, D. C.
 Garden Center of Greater Cleveland, East Boulevard at Euclid Ave., Cleveland, Ohio.
 Garden Centre, % Iveys, Asheville, N. C.
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 Garden Club of Gloucester, Mrs. N. S. Hopkins, Librarian, Nuttall, Va.
 Garden Club of Illinois, Shop 312, Palmer House, Chicago, Ill.
 Garden Club of Virginia (See Life)
 Garden Forum of Youngstown, % Public Library, 305 Wick Ave., Youngstown, Ohio.
 Gary Garden Club, % Mr. Ben Chris, Treas., 836 Floyd St., Gary, Ind.
 Georgetown Garden Club (See Life)
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 Home Garden Club of Denver, Inc., 800 Monroe St., Denver, Colo.
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- Little Garden Club of Sandy Spring, Mrs. Douglas Whitlock, Pres., Sandy Spring, Md.
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 Seattle Civic Garden Center, 1908 - 4th Ave., Seattle, Wash.
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